
2 ALTERNATIVES

This chapter describes alternatives the National Marine Fisheries Service (NMFS) is considering to implement proposed regulatory and non-regulatory vessel operational measures. Section 2.1 describes the full set of vessel operational measures being considered by geographical area. Section 2.2 outlines the six alternatives analyzed in the FEIS, including taking no action. With the exception of Alternative 1, the alternatives consist of subsets of the operational measures described in Section 2.1. Some alternatives include one type of measure only (Alternatives 2, 3 and 4); others include a combination of measures (Alternatives 5 and 6). Alternative 6, the proposed action, is NMFS' preferred alternative. Differences between the FEIS and DEIS are described in Section 2.3. Measures once considered by NMFS, but dismissed from further consideration early in the planning process, are discussed in Section 2.4. NEPA only requires that reasonable alternatives be considered in an EIS. An exception to this is the No Action Alternative, which, even if it is not a reasonable alternative, is analyzed in accordance with the Council on Environmental Quality (CEQ)'s Regulations to provide a baseline against which to assess the impacts of the other alternatives. Sections 2.5 and 2.6 discuss the environmentally preferable alternatives and the preferred alternative (proposed action), respectively.

2.1 Overview of the Vessel Operational Measures Considered

The regulatory and non-regulatory vessel operational measures considered in this FEIS would affect three regions along the East Coast of the United States: the southeastern United States region (SEUS), the mid-Atlantic United States region (MAUS), and the northeastern United States region (NEUS), where right whales aggregate or through which they migrate (see Figure 1-1). Seaward, the measures would, at a maximum, apply no farther than the US Exclusive Economic Zone¹ (EEZ).

The vessel operational measures considered are of three different types:

- **Seasonal Management Areas (SMAs).** SMAs are predetermined and established areas within which seasonal speed restrictions apply.
- **Dynamic Management Areas (DMAs).** DMAs are temporary areas consisting of a circle around a confirmed right whale sighting. The radius of this circle expands incrementally with the number of whales sighted and a buffer is included beyond the core area to allow for whale movement. Speed restrictions apply within DMAs, which may be mandatory or voluntary, depending on the alternative, and apply only when and where no SMA is in effect.
- **Routing Measures.** These consist of a set of routes designed to minimize the co-occurrence of right whales and ship traffic. Use of these routes is voluntary; therefore, they constitute a non-regulatory measure. However, mandatory speed restrictions would apply in the portions of the routes located within an active SMA. NMFS would monitor these routes and consider making them mandatory if use is low.

¹ The US EEZ extends to a distance 200 nm (370 km) from the baseline from which the breadth of the territorial sea is measured (www.archives.gov/federal_register/codification/proclamations/05030.html).

Specific measures of each type are described in greater detail by region of application in Sections 2.1.1 through 2.1.4. For each measure, which alternative(s) include(s) it is specified. Only a subset of the measures is included in the proposed action (Alternative 6), as summarized in Section 2.2.6.

As the modifications to the Boston Traffic Separation Scheme (TSS) and creation of an Area To Be Avoided (ATBA) in the Great South Channel are independent of the NMFS rulemaking and the vessel operational measures considered in the FEIS, they are no longer included as potential measures (see Section 1.4).

In all regions, unless otherwise noted, the vessel operational measures would apply only to non-sovereign² vessels subject to the jurisdiction of the United States that are 65 ft (19.8 m) or greater in length overall. Sixty-five feet is a vessel-size class recognized by the maritime community and commonly used in maritime regulations (e.g., Automatic Identification System [AIS]; International Navigational Rules Act, Rules of the Road sections) to distinguish between a motorboat and a larger vessel. All Federal vessels and those state enforcement vessels engaged in enforcement or human safety missions would be exempt. In response to comments about vessel maneuverability, NMFS also decided to exempt all vessels from the speed restrictions where oceanographic, hydrographic, and/or meteorological conditions severely restrict vessel maneuverability (see Section 1.4).

With regard to speed restrictions, NMFS' proposed limit is 10 knots; however, for comparison purposes, the FEIS also considers speed limits of 12 and 14 knots. Records of ship strikes in which vessel speed was known indicate that the majority of serious injuries to, or deaths of, whales resulting from ship strikes involved ships operating at speeds of 14 knots or more (Laist *et al.*, 2001; Jensen and Silber, 2003); therefore, a vessel traveling at less than 14 knots would reduce the likelihood and the severity of a ship strike. Recent analysis of these same records indicates that the probability of death or serious injury increases with ship speed. There is a 50 percent (0.26–0.71 for 95 percent confidence interval [CI]) chance that death or serious injury will occur if a right whale is hit by a vessel traveling at 10.5 knots. The probability increases to 75 percent at 14 knots, and exceeds 90 percent at 17 knots (Pace and Silber, 2005). Vanderlaan and Taggart (2007) came to a similar conclusion, determining that the probability of death from a collision was approximately 35–40 percent at 10 knots, 45–60 percent at 12 knots, and 60–80 percent at 14 knots; above 15 knots, it asymptotically approaches 100 percent.

Additionally, vessels traveling at lower speeds may also produce weaker hydrodynamic forces. At higher speeds, such forces have the capacity to first push a whale away from a moving ship and then draw the whale back toward the ship or propeller, resulting in a strike (Knowlton *et al.*, 1998). These forces increase with the vessel's speed; therefore, a whale's ability to avoid a ship in close quarters may be reduced at higher vessel speeds. In a modeling study using data from observed encounters of right whales with vessels, Kite-Powell *et al.* (2007) determined that more than half of the right whales located in or swimming into the path of an oncoming ship traveling at 15 knots or more are likely to be struck even if the whales attempt evasive action. The strike risk posed by a conventional ship moving 20 to 25 knots could be reduced by 30 percent by its slowing to 12 or 13 knots, and by 40 percent by slowing to 10 knots because of the whales' increased ability to detect and avoid approaching vessels.

² Non-sovereign vessels are commercial and recreational vessels, not owned, operated, or under contract to the US Federal Government.

Slutsky (2007) measured the forces involved in whale-vessel collisions using whale and ship models in a tow tank. The author determined that the magnitude of forces exerted on the whale increased linearly with vessel speed (Slutsky, 2007). A separate study examined the effects of these forces by looking at the biomechanical properties of right whale mandibles as related to blunt force trauma inflicted by a vessel (Campbell-Malone, 2007). Citing Kite-Powell *et al.* (2007), Campbell-Malone (2007) found that there are compounded (both behavioral and force of impact) benefits to implementing speed restrictions and predicted, like Kite-Powell *et al.* (2007), a reduction in right whale deaths as a result of vessel speed limits in right whale habitat.

2.1.1 Measures Considered for the Southeastern United States Region

Sighting data indicate that right whales occur in consistent aggregations in specific areas during certain times of the year; such areas and times are the foci of the measures considered for the SEUS region. Right whales occur in waters off the SEUS in winter and early spring; this area is utilized for calving and as a nursery. The only known calving area for North Atlantic right whales is located adjacent to the coasts of northern Florida and Georgia. This area was designated critical habitat for right whales in 1994 (59 FR 28793) (NMFS received a petition on July 11, 2002, requesting the expansion of the critical habitat by approximately 2,700 nm² (5,003.6 km²). On August 28, 2003, NMFS made a determination not to expand the critical habitat³, as the information presented in the petition did not adequately support the proposed expanded boundaries [68 FR 51758]).

There are three major ports in the SEUS (Brunswick, GA; Jacksonville, FL; and Fernandina, FL) and a number of small harbors primarily serving recreational vessels. The most recent confirmed ship strikes in the SEUS occurred in 2006: three mortalities and one serious injury have been documented for that year (Glass *et al.*, 2008).

2.1.1.1 Vessel Operational Measures

The operational measures considered for application in the SEUS region include SMAs and routing measures. The measures would apply only to non-sovereign vessels 65 ft (19.8 m) or more in length.

Within the SMAs (the extent and duration of which is described in Section 2.1.1.2), vessels would be required to slow down. As previously noted, NMFS is proposing a maximum speed of 10-knots; however, this FEIS also considers speeds of 12 and 14 knots.

Vessels would also be encouraged to use specific shipping routes (described in Section 2.1.1.2); use of the routes would be recommended, not mandatory.

2.1.1.2 Areas and Times

SMAs

Depending on the alternative, two different SMA options are being considered for the SEUS region, as described below.

³ The determination stated that the requested revision, "...is not warranted at this time. However, NMFS will continue to analyze the physical and biological habitat features essential to the conservation of right whales.

Southeast SMA Option

Under this option, the SMA would cover an area bounded to the north by latitude 31°27'N (coinciding with the northernmost boundary of the mandatory ship reporting system [MSRS]; see Section 1.2.1.2); to the south by latitude 29°45'N; to the east by longitude 80°51.6'W (eastern boundary of the MSRS), and to the west by the shoreline (see Figure 2-1). Speed restrictions would apply in the Southeast SMA from November 15 to April 15. This measure is included in Alternative 6.

Studies indicate that in this period, right whale concentrations are highest in the SEUS' calving and nursery areas. Because this is the only known calving area for North Atlantic right whales, the welfare of reproducing females in this area is vital to the recovery of the species and is a priority for protective measures. Estimates of the relative density of right whales in the SEUS region have been developed based on survey data from 1992 to 2003. In December, the areas of high sighting per unit effort (SPUE) occur in the northern part of the region. In January, the highest SPUE occurs in the central area of the habitat. In February, right whales are concentrated in the southern and central areas, with very high SPUE values near Fernandina Beach and Jacksonville, FL. In March, SPUE values are generally low, with higher occurrences in the northern area (NMFS, 2005, *unpublished*).

MSRS WHALESSOUTH/Critical Habitat SMA Option

Under this option, the SMA would include all waters within the MSRS WHALESSOUTH reporting area (see Section 1.2.1.2) and the presently-designated right whale critical habitat. It would be in effect from November 15 to April 15. This measure is included in Alternatives 3 and 5.

Shipping Routes

Recommended shipping routes, illustrated in Figure 2-2, have been established for the approaches to the ports of Jacksonville and Fernandina Beach, FL, and Brunswick, GA, which partially overlap with the designated right whale critical habitat area and experience high levels of vessel traffic. The goal of the routes is to consolidate traffic so as to avoid areas of relatively high right whale densities (Garrison, 2005). The USCG analyzed the routes for navigational environmental safety in a Port Access Routes Study (PARS) and released its report on May 24, 2006.⁴ The recommended routes were slightly modified after the PARS report was issued to avoid potential navigational hazards associated with fish havens and other potential obstructions that were hydrographically surveyed only recently. The revised routes were assessed taking into account whale occurrence and the expected distribution of vessel traffic (illustrated in Figure 2-3). As stated in Garrison (2006), "the vessel traffic patterns reported to the MSR system from 2001 – 2005 were used as a baseline to assess the reduction in risk. This raster representation of traffic was then multiplied by modeled right whale densities to quantify relative risk." Based on this analysis, which considered both ship-strike risk and potential navigational hazards, the routes are expected to provide a 40 percent average reduction in the risk of ship strikes to right whales (Garrison, 2006). Use of the routes would be recommended year-round. This measure is included in Alternatives 4, 5, and 6.

⁴ The PARS report and other documents on the recommended routes are available at <http://www.nmfs.noaa.gov/pr/shipstrike/routes.htm>.

Southeast SMA

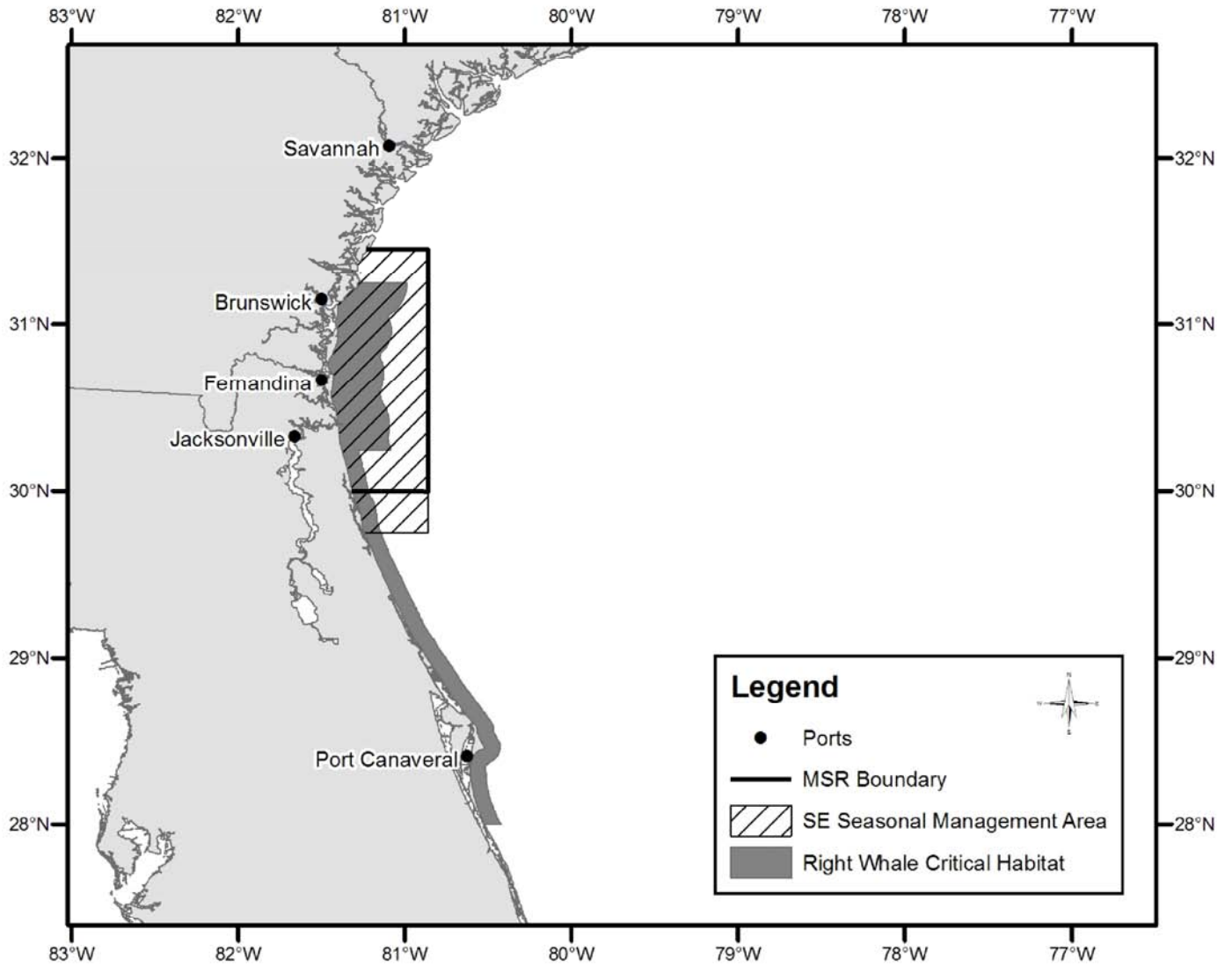


Figure 2-1

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Recommended Routes in the SEUS

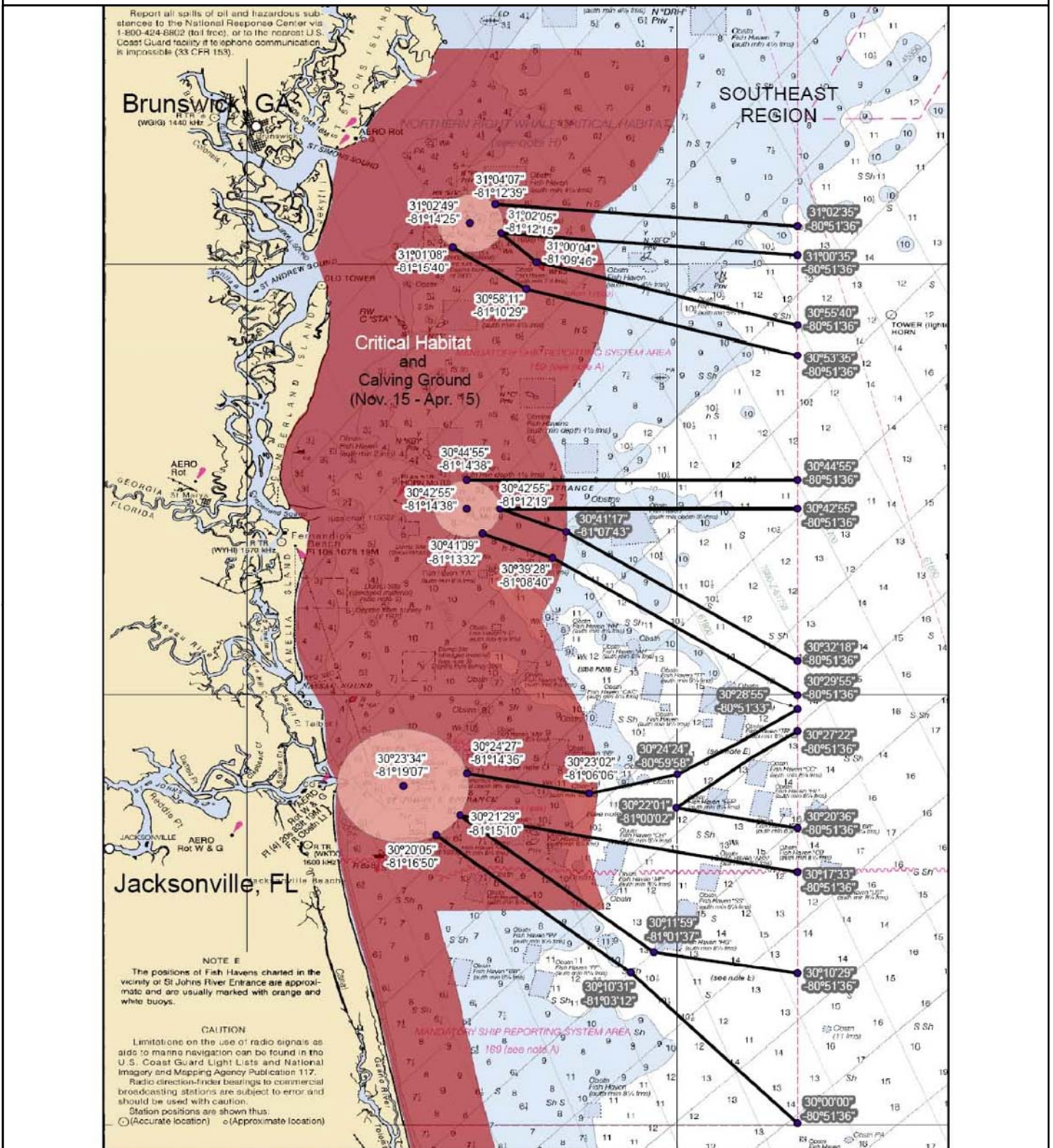
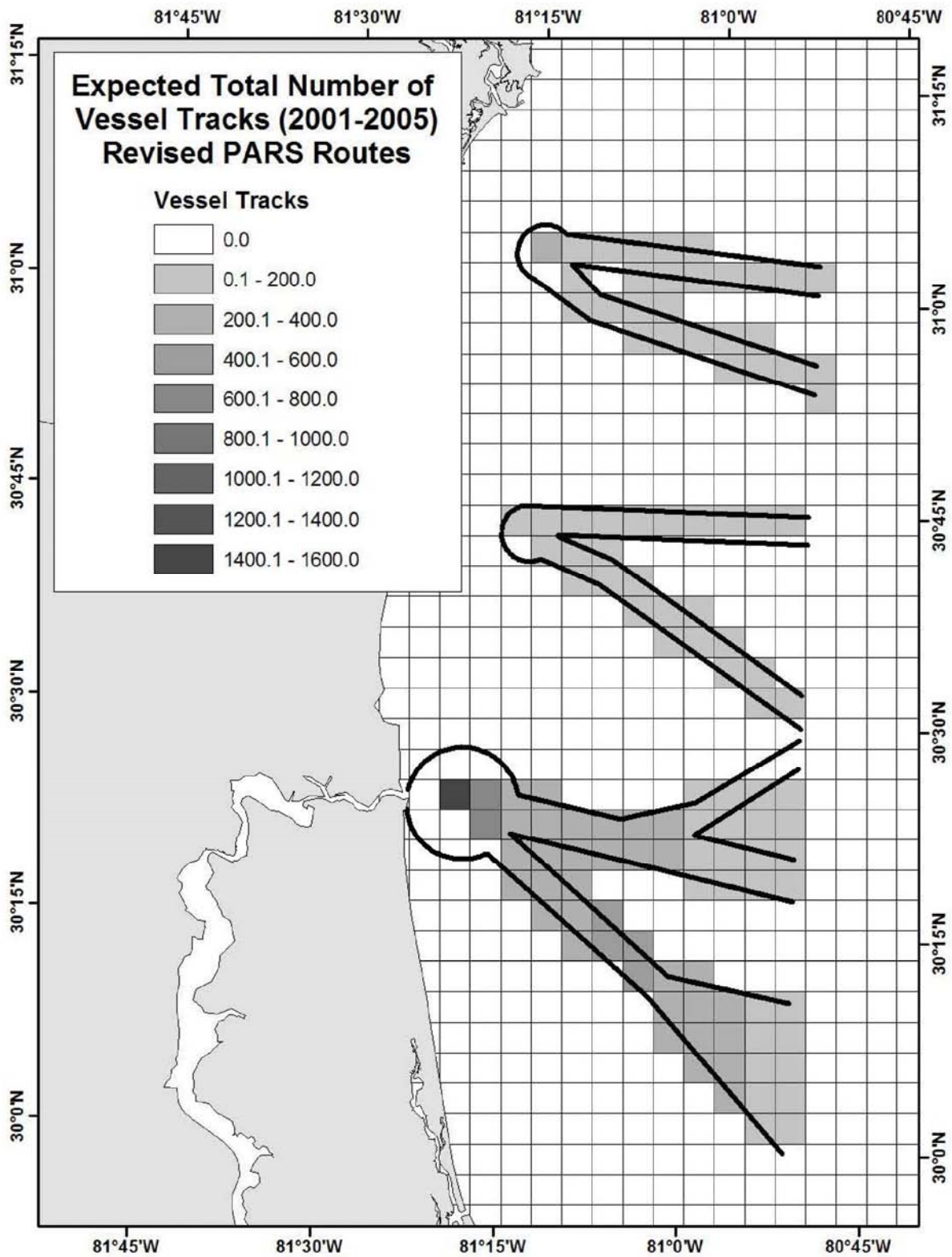


Figure 2-2



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Recommended SEUS Shipping Routes and Expected Distribution of Vessel Traffic



Source: Garrison (2006), The blocks are 4x4 km squares (Raster cell representation) used to model right whale sightings per unit effort and summarize vessel traffic.

Figure 2-3



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2.1.2 Measures Considered for the Mid-Atlantic United States Region

The MAUS region includes the coastal migratory corridor right whales use to travel between their calving and nursery grounds in the SEUS region and the feeding grounds in the NEUS region and Canada. The mother-calf pairs that are traveling through the mid-Atlantic generally spend more time at or near the surface, which makes them even more prone to ship strike. Many ships enter ports throughout the MAUS region and traverse the migratory corridor, creating a high-risk situation for migrating right whales. Given the small population size, the death of any right whale is serious, and during the 4-year period from 2001 to 2004, five females and calves died from ship strikes in the MAUS region. Two right whale calves were found dead in the MAUS region in 2001; one had propeller wounds, indicating that the death was caused by a ship strike. In 2002, a one-year old female was found dead off the coast of Ocean City, Maryland. In 2004, a dead pregnant female right whale, first observed floating off the Virginia coast, subsequently stranded in North Carolina, where it was determined to have died from a vessel collision. Also in 2004, another pregnant female was found dead in North Carolina; the left half of its fluke had been severed, indicating a ship strike. These five NMFS-confirmed ship strike mortalities (Cole *et al.*, 2006) attest to the risk of ship strikes in the MAUS.

2.1.2.1 Vessel Operational Measures

The operational measures considered for the MAUS region consist of SMAs. The SMAs and associated speed restrictions would apply only to non-sovereign vessels 65 ft (19.8 m) or longer. As previously noted, NMFS is proposing a speed restriction of 10 knots; however, this FEIS also considers restrictions of 12 and 14 knots.

2.1.2.2 Areas and Times

Depending on the alternative, three SMA options are being considered: a) separate SMA out to 20 nm from shore around certain port areas; b) separate SMA out to 30 nm from shore around the MAUS port areas; and c) a continuous SMA out 25 nm from the entire MAUS coast.

The 1972 Convention on International Regulations for Preventing Collisions at Sea (COLREGS) developed lines to demarcate harbor entrances, known as COLREGS demarcation lines. These lines were established to delineate the waters in which mariners must comply with either the COLREGS or the Inland Navigational Rules Act of 1980 (Inland Rules). Waters inside the lines are Inland Rules Waters; waters outside the lines are COLREGS Waters. The COLREGS lines provided the coastal baseline for the definition of the SMAs around the MAUS ports. Vessels transiting waters landward of these lines (Inland Rules Waters) would not have to adhere to speed restrictions or any operational measure. All vessels transiting seaward of the COLREGS lines would be required to adhere to speed restrictions within the SMAs. Applicable COLREGS lines for the MAUS ports are provided in Appendix C.

Separate SMAs Options

20-nm SMAs Option

Under this option, six discrete SMAs would be defined around the nine port areas in the MAUS region, as listed below and illustrated in Figure 2-4. Of the six, five would extend out to 20 nm and one out to 30 nm, as detailed below. Those SMAs would be in effect from November 1 to April 30, consistent with right whale occurrence in the MAUS. This measure is included in Alternative 6.

Separate SMAs – 20-nm Option

1. South and east of Block Island Sound (Montauk Point to western end of Martha's Vineyard). Out to 30 nm. See Figure 2-5.
2. Ports of New York and New Jersey. Out to 20 nm. See Figure 2-6.
3. Delaware Bay (Ports of Philadelphia and Wilmington). Out to 20 nm. See Figure 2-7.
4. Entrance to Chesapeake Bay (Ports of Hampton Roads and Baltimore). Out to 20 nm. See Figure 2-8.
5. Ports of Morehead City and Beaufort, NC. Out to 20 nm. See Figure 2-9.
6. Continuous SMA between and including the Ports of Wilmington, NC, and Savannah, GA. Out to 20 nm. See Figure 2-10.

The Block Island Sound SMA would be a 30-nm (56-km)-wide rectangular area extending south and east of the mouth of the sound. Sightings data show that in this area, approximately 90 percent of right whale sightings from 1972 through 2000 occurred within 30 nm (56 km) of the coast (NMFS, 2008, *unpublished*). The SMAs for New York and New Jersey, Delaware Bay, Chesapeake Bay, and Morehead City and Beaufort, North Carolina would be circular, each with a 20-nm (37-km) radius. The remaining four ports – Wilmington, Georgetown, Charleston, and Savannah – would share a continuous 20-nm (37-km) SMA. An analysis of sightings data from 1972 through 2000 from Connecticut to the South Carolina/Georgia border indicated that approximately 83 percent of all right whale sightings (total sample size $n = 290$) occurred within 20 nm (37 km) of the coast (NMFS, 2008, *unpublished*). The distribution patterns mentioned in this section are illustrated in Figure 2-11.

30-nm SMAs Option

Under this option, vessel operational measures in the MAUS region would consist of 30-nm (56-km) SMAs around the nine port areas in the MAUS region. These 30-nm (56-km) SMAs would be in effect from November 1 to April 30, consistent with right whale occurrence in the MAUS. The Block Island Sound SMA would be rectangular area extending south and east of the mouth of the sound. The SMAs for New York and New Jersey, Delaware Bay, Chesapeake Bay, and Morehead City and Beaufort, North Carolina would be circular. The remaining four port areas – Wilmington, Georgetown, Charleston, and Savannah – would share a continuous SMA adjacent to the northern boundary of the SEUS SMA (see Section 2.1.1.2).

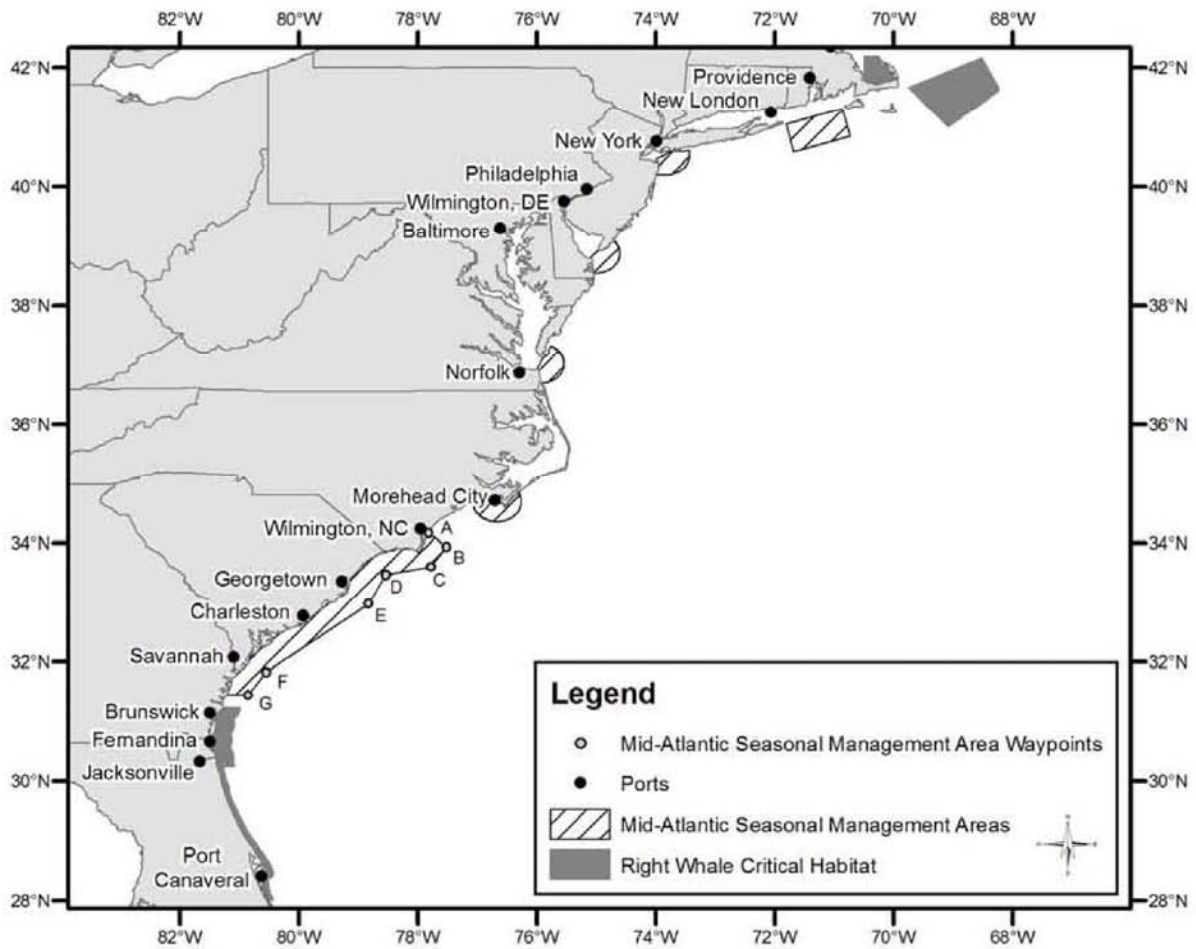
Continuous 25-nm SMA Option

Under this option, a SMA would be defined in the MAUS region that would include all waters 25 nm (46 km) seaward of the coastline between Providence, RI/New London, CT (Block Island Sound) and Savannah, GA. This SMA would be in effect from October 1 to April 30. This measure is included in Alternatives 3 and 5.

2.1.3 Measures Considered for the Northeastern United States Region

Right whales use the NEUS region mostly for foraging. Data indicate that right whales concentrate their feeding efforts in four distinct zones of the NEUS region: Cape Cod Bay, Off Race Point, the Great South Channel, and the Gulf of Maine. Vessel operational measures considered for the NEUS vary with the zone considered and include new designated shipping lanes as well as speed restrictions within SMAs.

Separate SMAs in MAUS Region (20 - nm Option)



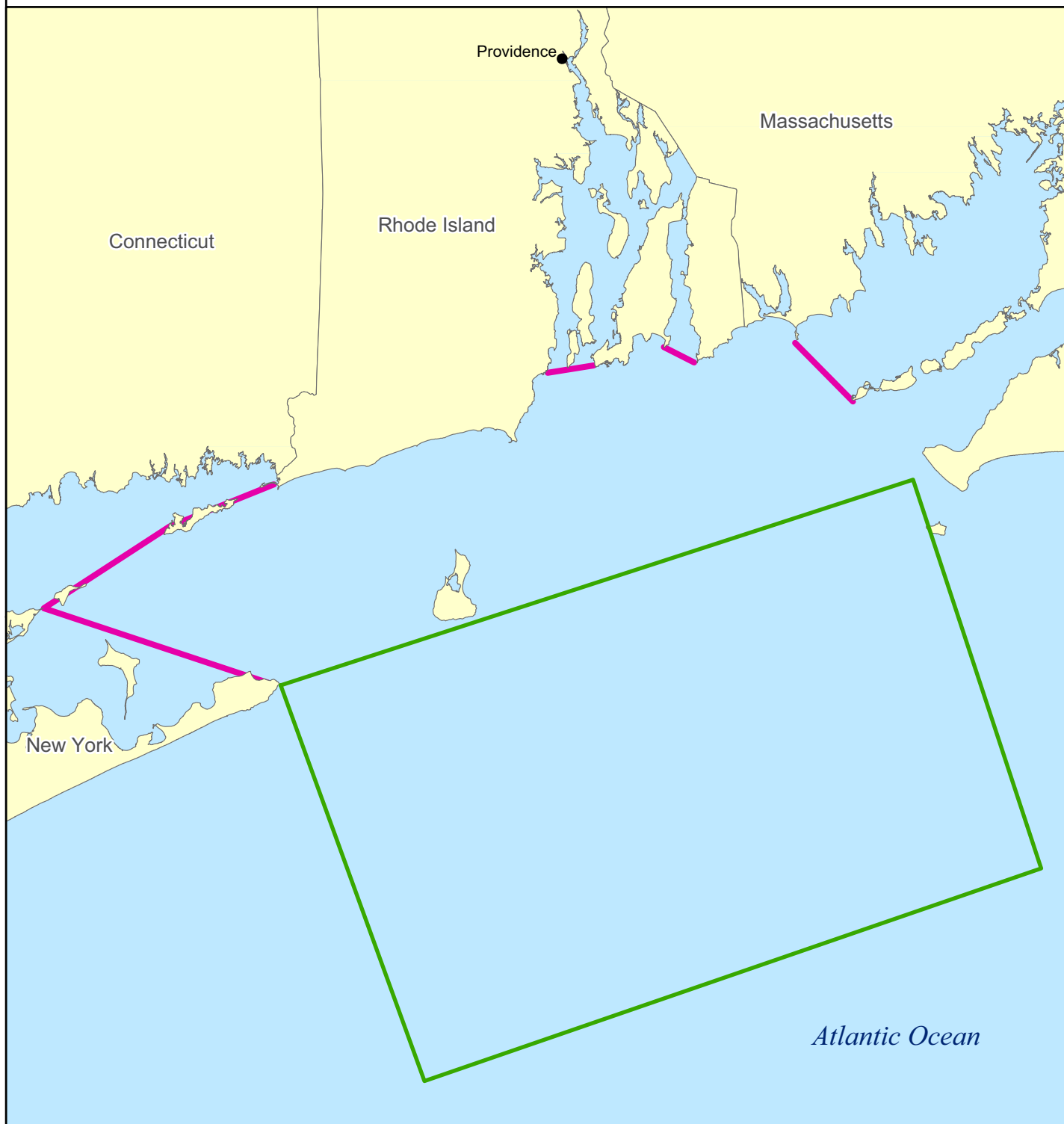
Continuous 20 - nm SMA



Point	Latitude	Longitude
A	34°10'30"	77°49'12"
B	33°56.42"	77°31'30"
C	33°36'30"	77°47'06"
D	33°28'24"	78°32'30"
E	32°59'06"	78°50'18"
F	31°50'00"	80°33'12"
G	31°27'00"	80°51'36"

Figure 2-4

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Block Island SMA



-  COLREGS Line
-  Block Island 30 nm SMA

0 6.5 13 26 Miles

0 6.5 13 26 Kilometers





Note: COLREGS lines are approximate and this chart should not be used for navigation.

Figure 2-5

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Ports of New York and New Jersey SMA



-  COLREGS Line
-  20 Nautical Mile SMA (Approximate)

0 6 12 24 Miles

0 6 12 24 Kilometers

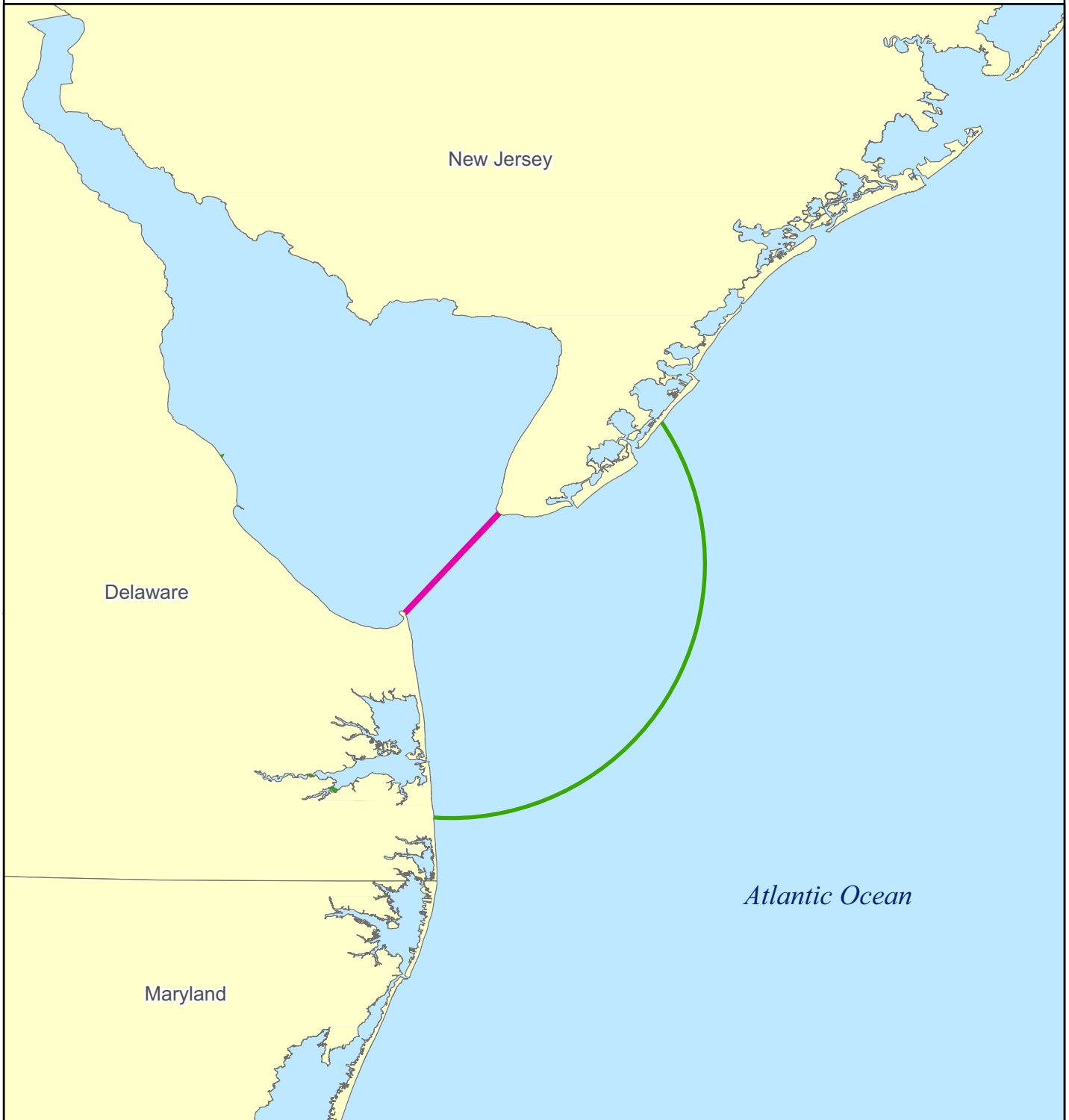




Note: COLREGS lines are approximate and this chart should not be used for navigation.

Figure 2-6

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Delaware Bay SMA



-  COLREGS Line
-  20 Nautical Mile SMA (Approximate)

0 6.5 13 26 Miles

0 6.5 13 26 Kilometers





Note: COLREGS lines are approximate and this chart should not be used for navigation.

Figure 2-7

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Chesapeake Bay SMA



-  COLREGS Line
-  20 Nautical Mile SMA (Approximate)

0 5 10 20 Miles

0 5 10 20 Kilometers





Note: COLREGS lines are approximate and this chart should not be used for navigation.

Figure 2-8

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Morehead City & Beaufort, NC SMA



-  COLREGS Line
-  20 Nautical Mile SMA (Approximate)

0 6 12 24 Miles

0 6 12 24 Kilometers

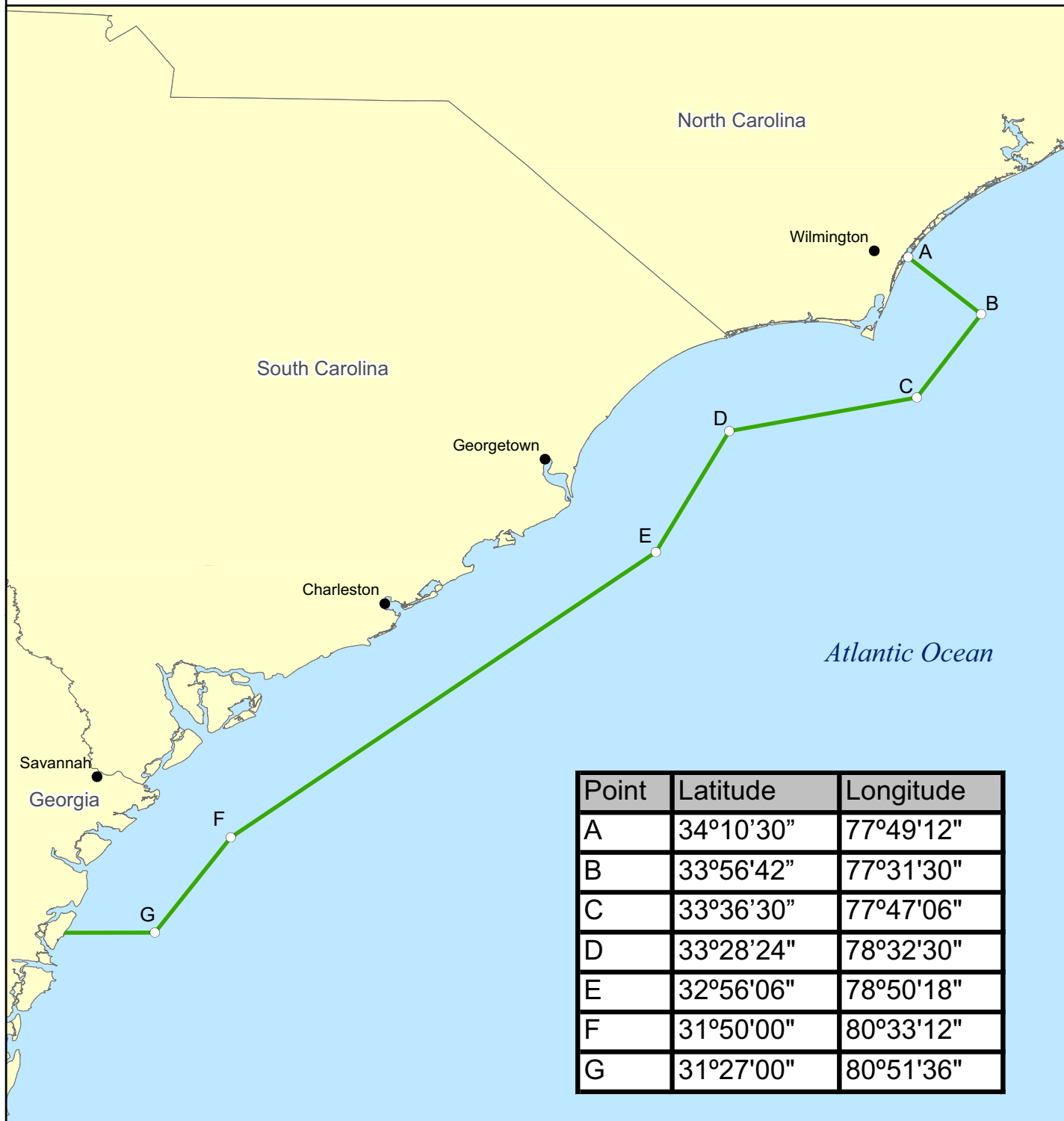


Note: COLREGS lines are approximate and this chart should not be used for navigation.


Figure 2-9

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Continuous 20-nm SMA



Point	Latitude	Longitude
A	34°10'30"	77°49'12"
B	33°56'42"	77°31'30"
C	33°36'30"	77°47'06"
D	33°28'24"	78°32'30"
E	32°56'06"	78°50'18"
F	31°50'00"	80°33'12"
G	31°27'00"	80°51'36"

 20 Nautical Mile SMA (Approximate)

0 20 40 80 Miles

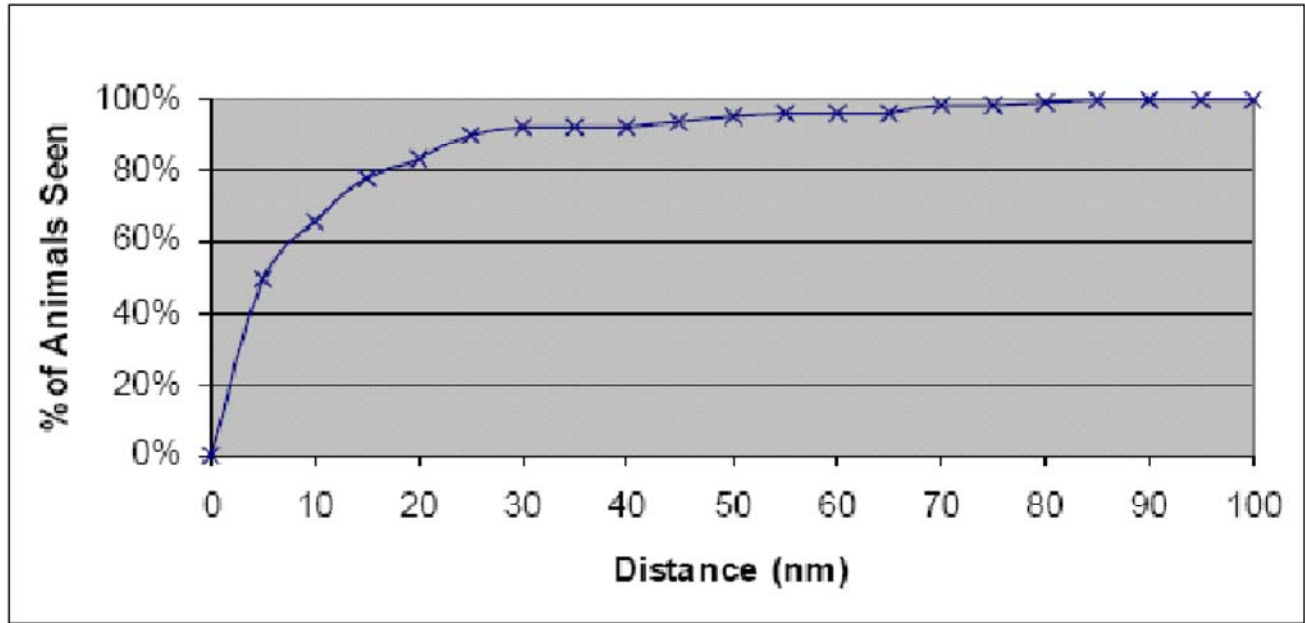
0 20 40 80 Kilometers



Figure 2-10

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Cumulative Distribution of Right Whales Offshore of NC - VA, 1960 - 2003



Right Whale Sighting Distances Offshore by Latitude, 1960 - 2003

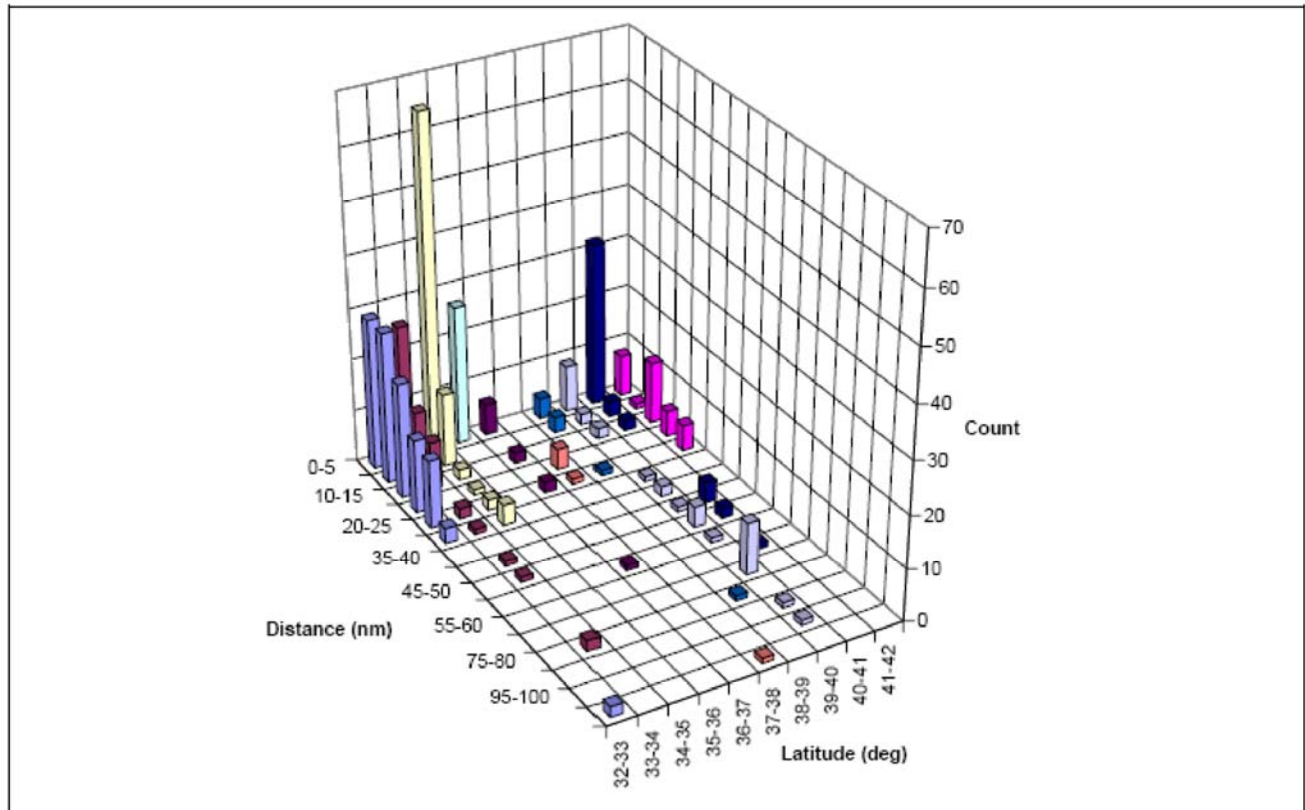


Figure 2-11

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2.1.3.1 Cape Cod Bay

Right whales occur in Cape Cod Bay from winter through spring, when food is typically abundant. Given its importance as a feeding and aggregation area, Cape Cod Bay was designated as right whale critical habitat in 1994 (50 CFR 226.203). (The critical habitat petition referred to in Section 2.1.1 also requested the expansion and combination of the Cape Cod Bay and Great South Channel critical habitat areas. NMFS concluded that this request was unwarranted at the time, but analysis is underway with respect to redefining the areas).

Vessel Operational Measures

Depending on the alternative, measures considered for Cape Cod Bay (CCB) include SMAs and recommended shipping routes. Within the SMAs (when in effect) non-sovereign vessels 65 ft (19.8 m) and longer would have to observe a required speed restriction. NMFS is proposing a 10-knot restriction; however this FEIS also considers 12- and 14-knot restrictions. Use of the shipping routes would be recommended but not required.

Areas and Times

CCB SMA

The SMA would cover the entire bay, including the Cape Cod Bay critical habitat and the area directly west of the critical habitat all the way to the shoreline, with its northern boundary at latitude 42°12'N (see Figure 2-12). The SMA would be in effect from January 1 to May 15, consistent with right whale occurrence illustrated in Figure 2-13. This measure is included in Alternative 6.

Critical Habitat SMA

The area would coincide with the critical habitat and thus be smaller than the CCB SMA. However, unlike that SMA, it would be effective year-round. It is included in Alternatives 3 and 5.

Shipping Routes

The recommended routes are illustrated in Figure 2-14. The routes have been established from Cape Cod Canal through the Critical Habitat, on the western side of the bay, towards Massachusetts Bay and other points north. The recommended routes minimize the travel distance through the Cape Cod Bay Critical Habitat for ships entering and leaving the port of Provincetown via Cape Cod Canal or from the north, by routing them along the edges of the Critical Habitat (NMFS, 2004e), thus minimizing collision risks. Use of the routes would be recommended year-round. Where and when the routes overlap with an active SMA, vessels would be required to observe the associated speed restriction. This measure is included in Alternatives 4, 5, and 6.

2.1.3.2 Off Race Point Area

Race Point is located at the tip of Cape Cod and the Off Race Point SMA would consist of waters around the northern end of Cape Cod. As food resources in Cape Cod Bay diminish toward the end of April, right whales begin to migrate toward the Great South Channel to feed on offshore prey aggregations. Before reaching the Great South Channel, right whales tend to transit or aggregate in neighboring areas, such as Stellwagen Bank, areas east of Stellwagen Bank, and the northern end of Provincetown Slope, which is the area extending east of Cape Cod to the

Great South Channel. For the purposes of this FEIS, these areas are collectively referred to as the “Off Race Point” area, a box approximately 50 by 50 nm (93 by 93 km) in size to the north and east of Cape Cod (see Figure 2-12) and defined by the following coordinates, developed based on right whale sighting data and vessel traffic patterns:

**Table 2-1
Coordinates for the Off Race Point Area**

Location	Latitude (N)	Longitude (W)	Comment
NW Corner	42° 30'	070° 30'	
NE Corner	42° 30'	069° 45'	
SE Corner	41° 40'	069° 45'	
Southern Mid-point	41° 40'	069° 57'	Continues North along the eastern shore of Cape Cod to the next point.
Western Center-point	42° 04.8'	070° 10'	(Northern tip of Cape Cod)
Western Center-point	42° 12'	070° 15'	(NE corner of critical habitat)
SW Corner	42° 12'	070° 30'	(NW corner of critical habitat)

Ship traffic within the Off Race Point area is heavy, primarily into and out of Boston and associated harbors, exposing right whales to the possibility of ship strikes. Boston was the most frequently reported destination for ships that traveled through designated critical habitat areas: 69 percent of the 2,146 ships that reported to the Northeast MSRS were bound for Boston (Ward-Geiger et al., 2005).

Vessel Operational Measures

SMA's are the measures considered for the Off Race Point Area. The SMAS would apply only to non-sovereign vessels 65 ft (19.8 m) in length and longer. Such vessels would be required to slow down through the SMA or to route around it. NMFS is proposing a 10-knot restriction; however, this FEIS also analyses 12-and 14-knot restrictions.

Areas and Times

Off Race Point SMA

The Off Race Point SMA would cover the Off Race Point Area as defined in Table 2-1 and illustrated in Figure 2-12. The Off Race Point SMA would be effective from March 1 to April 30, consistent with historic right whale sighting information. This measure is included in Alternative 6. Figure 2-15 shows the right whale sighting data that was analyzed to determine the spatial and temporal boundaries of the Off Race Point SMA.

SAM West SMA

Alternatively, this SMA would coincide with the expanded Seasonal Area Management (SAM) West identified in the ALWTRP (See Section 1.2.2). The extent of SAM West is shown in Figure 2-16. Its eastern and northern boundaries coincide with those of the Off Race Point area as defined above. To the west, it extends beyond it, to 69° 24' longitude. This measure is included in Alternatives 3 and 5.

Proposed Cape Cod Bay, Off Race Point, and Great South Channel SMAs

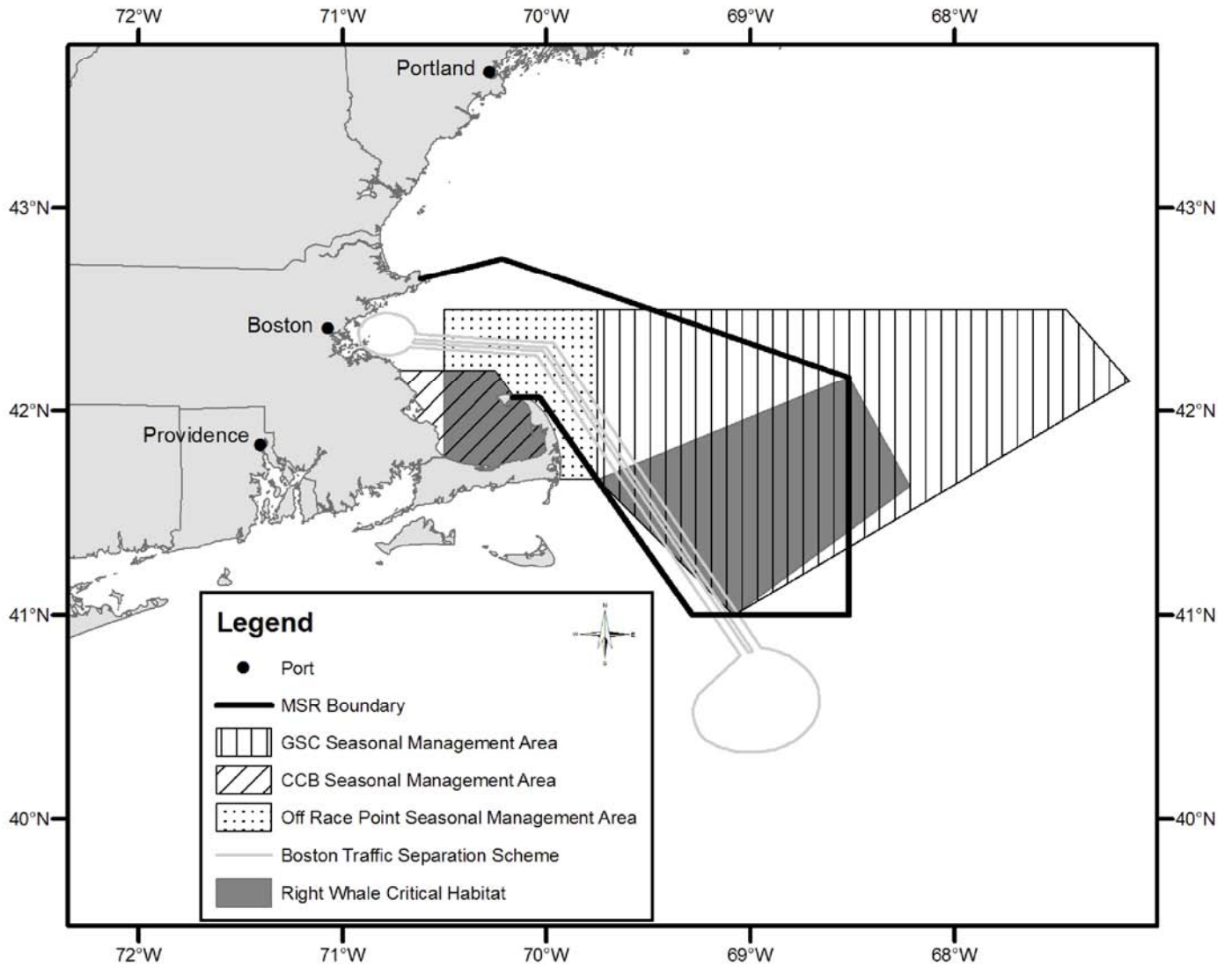
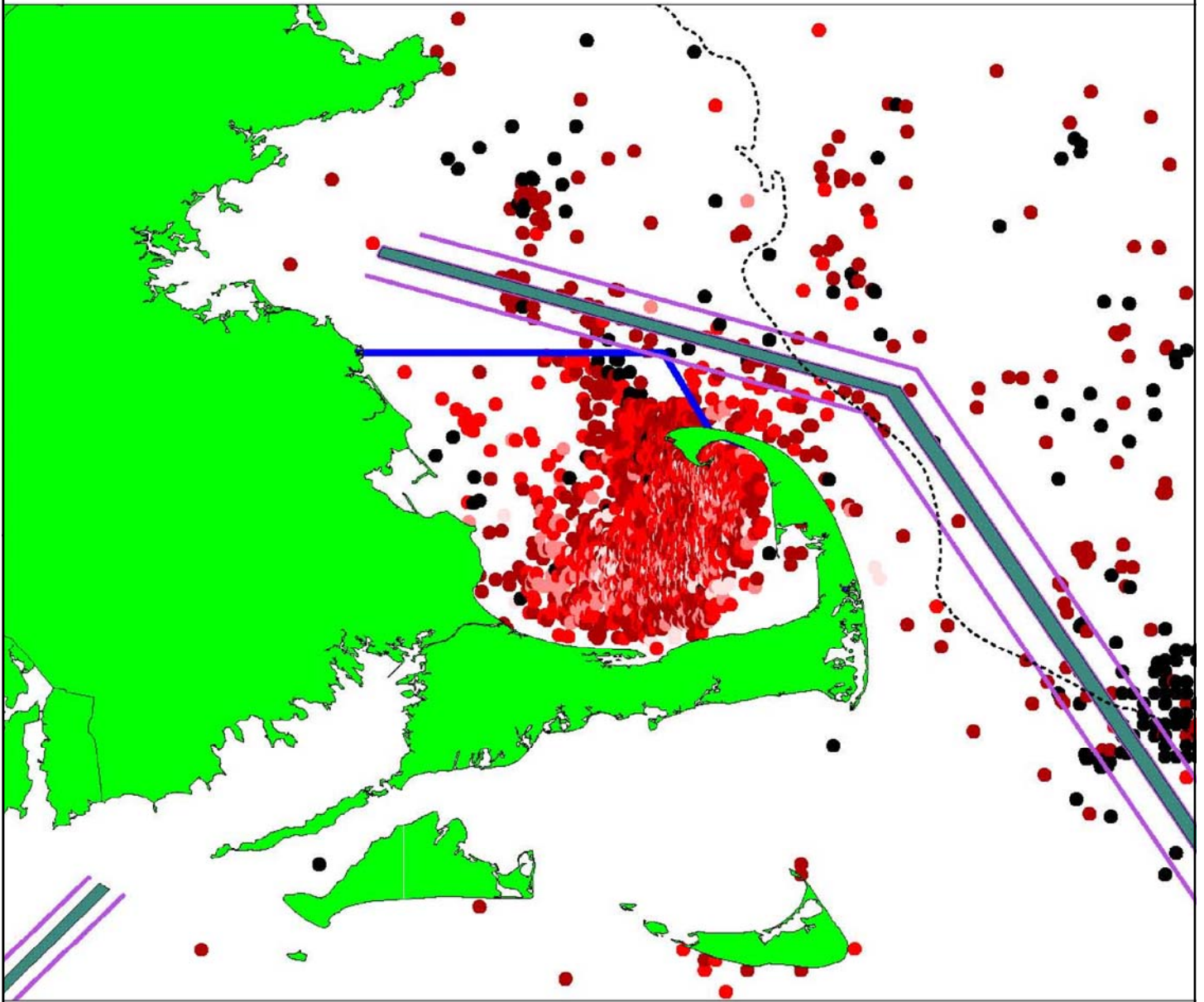


Figure 2-12

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Right Whale Sightings in the Cap Cod Bay SMA
January - May, 1970 - 2003



- US
- 50 fathom contour
- Traffic Separation Scheme
- Traffic Lane
- Cape Cod Bay SMA
- Right whales: 1970-2003
- January
- February
- March
- April
- May

20 0 20 40 Miles

Figure 2-13



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Recommended Shipping Routes in Cape Cod Bay

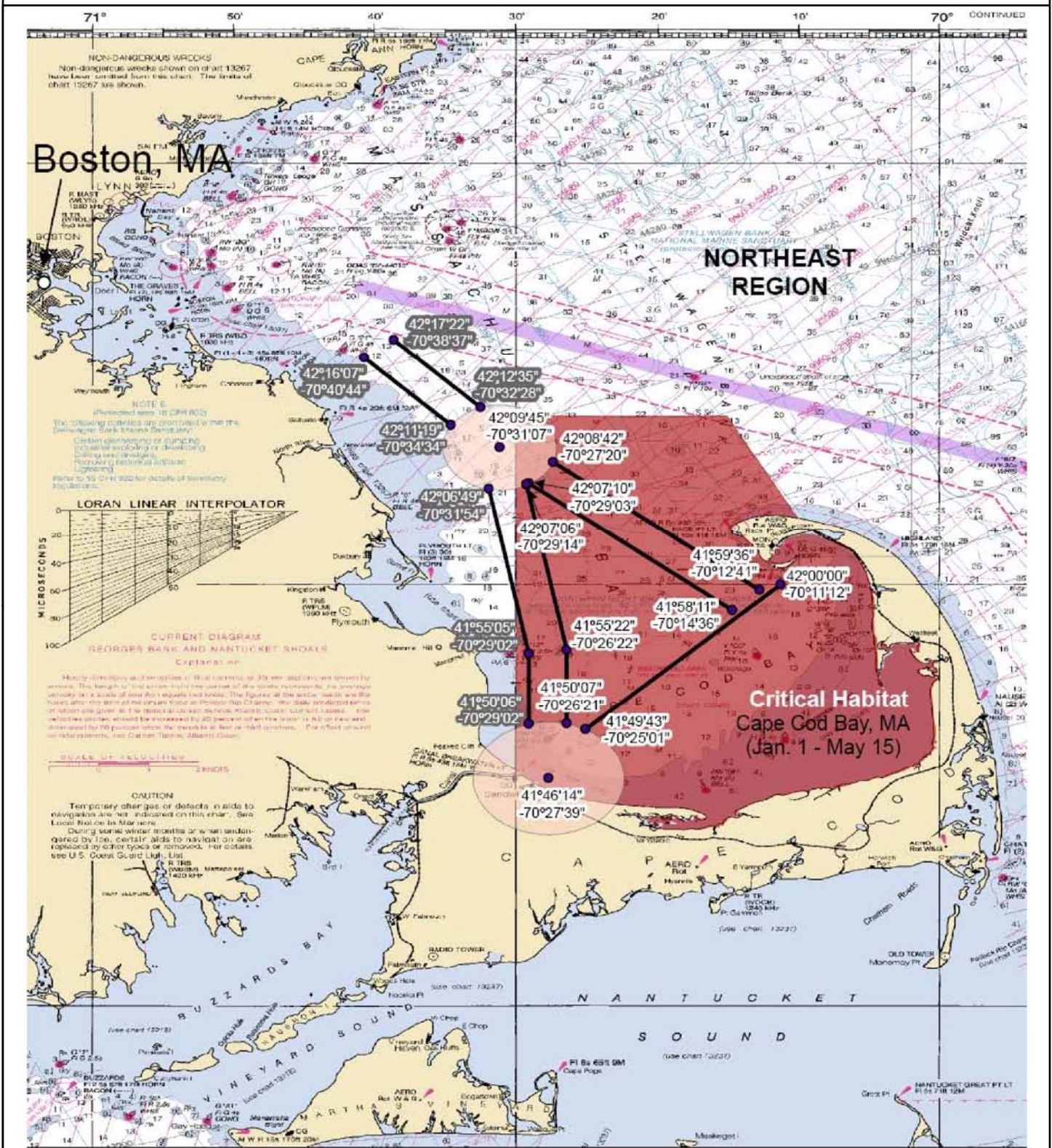
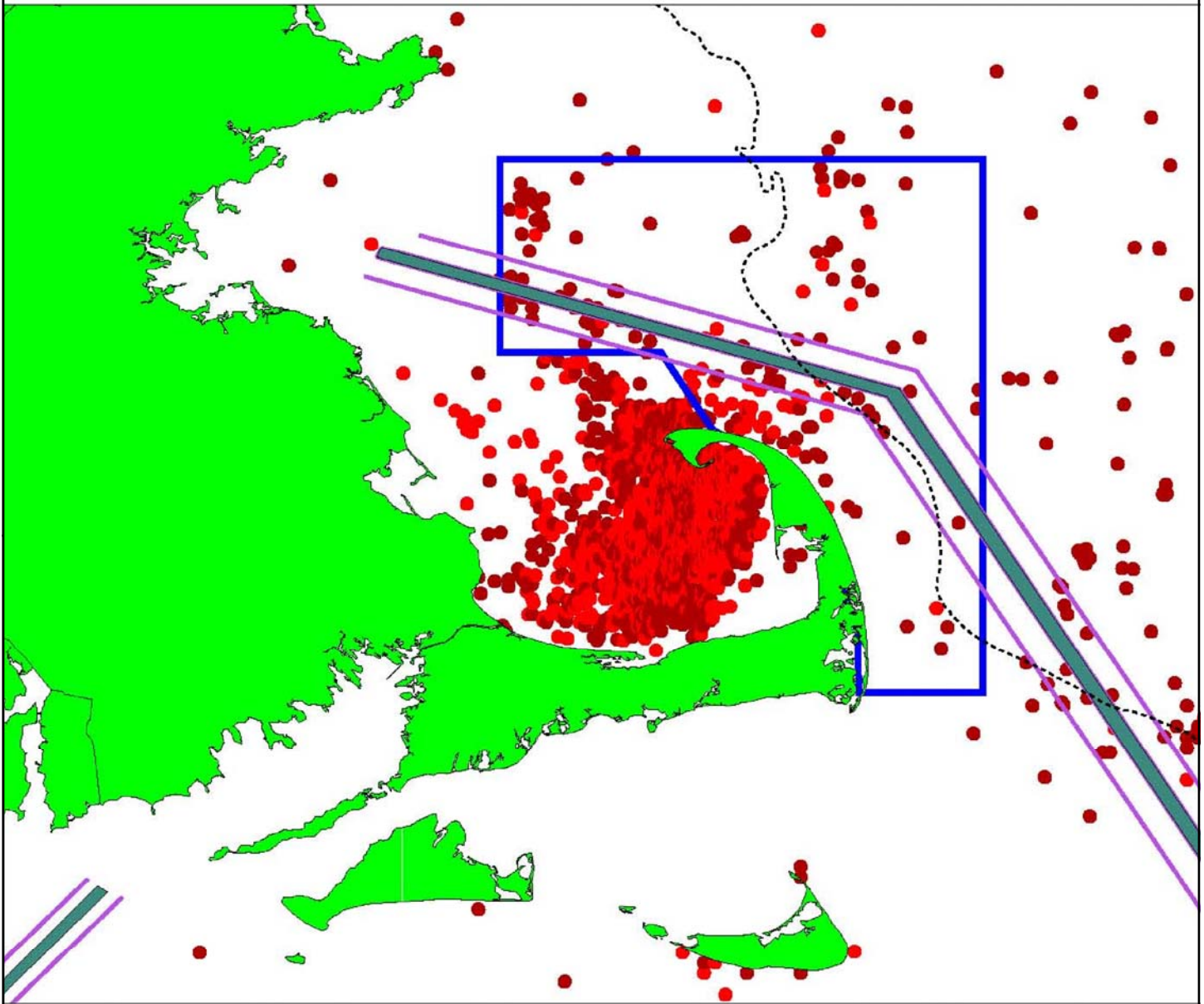


Figure 2-14



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Right Whale Sightings in the Off Race Point SMA
March - April, 1970 - 2003



- US
- 50 fathom contour
- Traffic Separation Scheme
- Traffic Lane
- Off Race Point SMA
- Right whales: 1970-2003
- March
- April

20 0 20 40 Miles

Figure 2-15



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ALWTRP SAMs

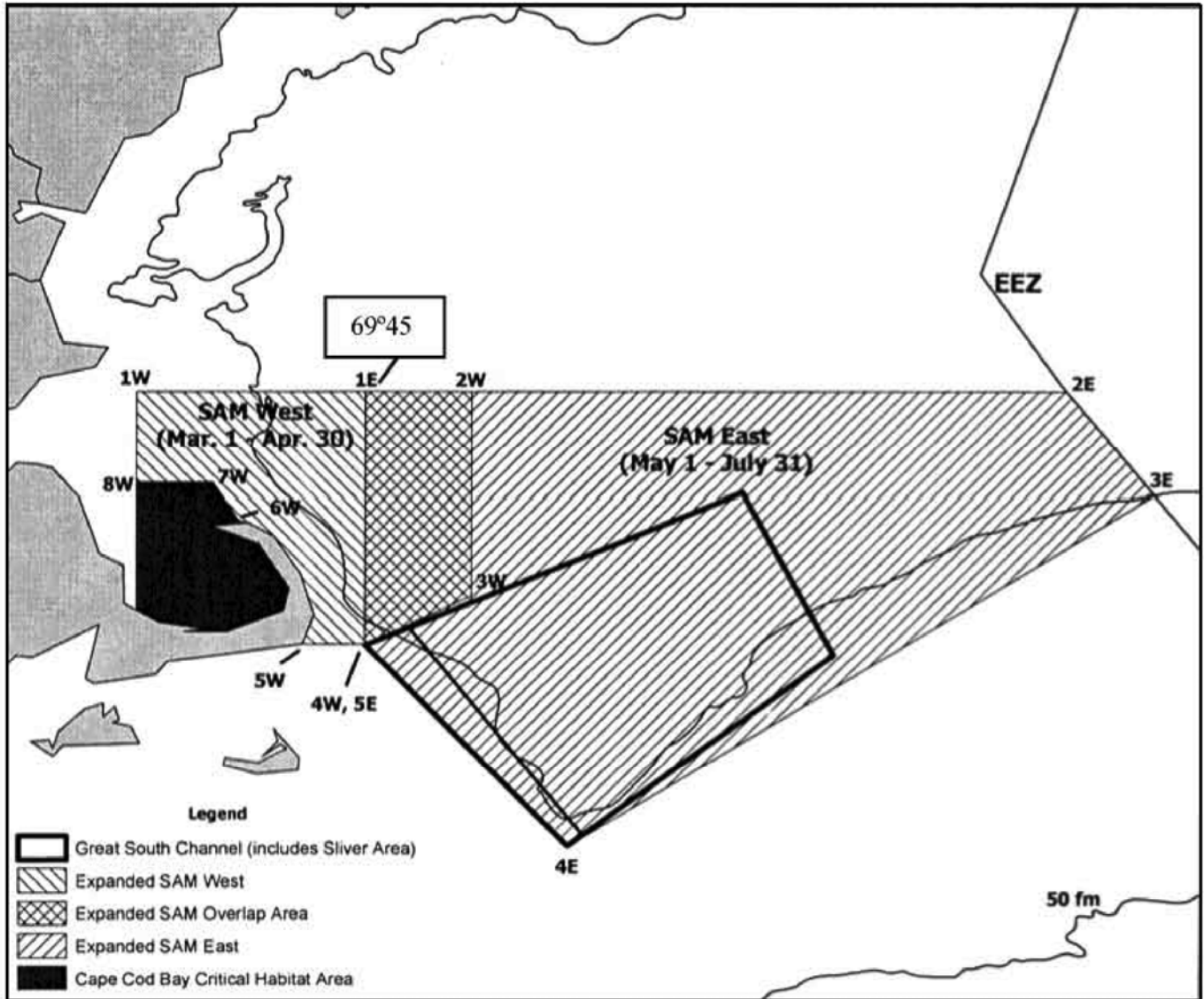


Figure 2-16



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2.1.3.3 Great South Channel

During spring and early summer, large numbers of right whales aggregate in the Great South Channel, a designated critical habitat and important feeding ground. The critical habitat area is located in the southern portion of the Great South Channel management area (see Figure 2-12). At times, more than half the entire North Atlantic right whale population is feeding in or passing through the Great South Channel. Some individuals are rarely, if ever, observed in other feeding grounds (such as the Bay of Fundy) at this time of year. The GSC area experiences heavy commercial ship traffic; analysis of reports to the MSRS identified three high-use traffic corridors through the Great South Channel critical habitat (Ward-Geiger *et al.*, 2005). Thus, vessel collisions with right whales are a serious risk when whales are present.

Operational Measures

The operational measure considered for the Great South Channel area are SMAs. The SMAs would apply to all non-sovereign vessels 65 ft (19.8 m) and longer, which would be required to slow down when traversing them. As previously noted, NMFS is proposing a 10-knot restriction; however, this FEIS also analyses 12- and 14-knot restrictions.

Areas and Times

GSC SMA

Under this option, the SMA would cover the area defined in Table 2-2 and illustrated in Figure 2-12. The boundaries were defined based on right whale sighting and recent survey data.

Table 2-2
Coordinates for the Great South Channel SMA

Location	Latitude (N)	Longitude (W)
NW Corner	42° 30'	069° 45'
NE Corner	42° 30'	067° 27'
SE Corner	42° 09'	067° 08.4'
Southern Mid-point	41° 00'	069° 05'
SW Corner	41° 40'	069° 45'

Speed restrictions would be in effect within the GSC SMA from April 1 to July 31, corresponding to the peak period of right whale presence, illustrated in Figure 2-17, which shows the right whale sighting data that was analyzed to determine the spatial and temporal boundaries of the GSC SMA. This measure is included in Alternative 6.

SAM East SMA

Alternatively, this SMA would coincide with the expanded Seasonal Area Management (SAM) East identified in the ALWTRP (See Section 1.2.2). The extent of SAM East is shown in Figure 2-16. The SAM coincides with the GSC SMA as defined above except to the west, where it extends to 69° 24' longitude only instead of 69° 45'. This measure is included in Alternatives 3 and 5.

2.1.3.4 Summary of Operational Measures Considered for the NEUS Region

A summary of the measures considered for the NEUS region is presented in Table 2-3.

Table 2-3
Summary of Operational Measures Considered for the NEUS Region

Area	Type of Measure	Period When Applicable	Included in Alternative
Cape Cod Bay	CCB SMA	January 1 to May 15	6
	or Critical Habitat SMA	Year-round	3 and 5
	and/or Recommended Routes	Year-round	4, 5 and 6
Off Race Point Area	Off Race Point SMA	March 1 to April 30	6
	or SAM West SMA	Year-round	3 and 5
Great South Channel	GSC SMA	April 1 to July 31	6
	or SAM East SMA	Year-round	3 and 5

2.1.4 Measures Considered for All Three Regions

DMAs are a type of operational measure that is non-region specific and could be applied in all three regions whenever right whales are determined to be present.

DMAs consist of a circular buffer zone drawn around a core area of whale sightings that would reduce the risk of ship strikes to the whales. DMAs would only occur when and where other measures (i.e., SMAs) are not in effect. The size of the buffer, as described below, is determined by the number of whales in the aggregation.

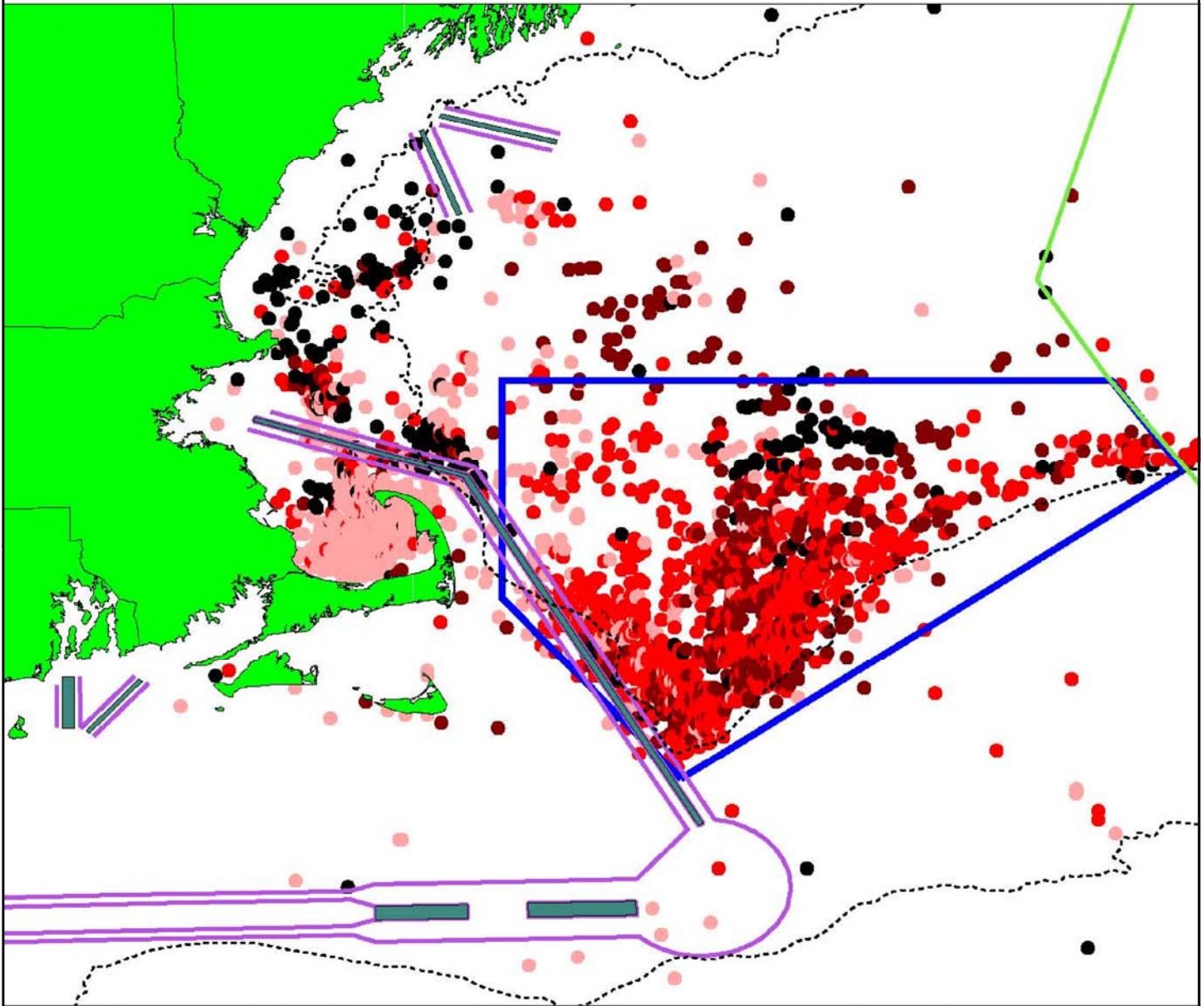
The type of right whale aggregation that would trigger the implementation of a DMA has been defined based on the ALWTRP DAM trigger criteria, which were developed by Clapham and Pace (2001). A DMA would be triggered by a single reliable report from a qualified individual⁵ of an aggregation of three or more right whales within 75 nm² (257 km²), such that right whale density is equal to or greater than 0.04 right whales per nm² (3.43 km²), that is, the equivalent of four right whales per 100 nm² (343 km²). Clapham and Pace's study found that such an aggregation is indicative of a feeding group and is likely to persist for up to two weeks.

When the criteria are met, NMFS would use the following procedures to establish a DMA:

1. A circle with a radius of at least 2.8 nm (5.2 km) would be drawn around the location of each individual sighting. This radius would be adjusted for the number of whales, so that a density of four right whales per 100 nm² (343 km²) is maintained.

⁵ A qualified individual is an individual ascertained by NMFS to be reasonably able, through training or experience, to identify a right whale. Such individuals include, but are not limited to, NMFS staff, USCG and Navy personnel trained in whale identification, scientific research survey personnel, whale-watch operators, naturalists, and mariners trained in whale species identification through disentanglement training or some other training program deemed adequate by NMFS. A reliable report is a credible right whale sighting on the basis of which a DAM zone would be triggered.

Right Whale Sightings in the Great South Channel SMA
April - July, 1970 - 2003



- US
- Hague Line
- - - 50 fathom contour
- ▬ Traffic Separation Scheme
- ▬ Traffic Lane
- ▭ Great South Channel SMA
- Right whales: 1970-2003
 - April
 - May
 - June
 - July

50 0 50 100 Miles



Figure 2-17

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Information on how to calculate the length of the radius can be found in the final rule to amend the regulations that implement the ALWTRP (67 FR 1133).

2. If any circle or group of contiguous circles includes three or more right whales, this core area and its surrounding waters would be a candidate DMA zone.

Following this designation, the agency would expand this initial core area to provide a buffer in which the whales could move and still be protected. NMFS would determine the size of the DMA zones as follows:

1. A large circular zone would be drawn extending 15 nm (27.8 km) from the perimeter of a circle around each core area.
2. The DMA would be a polygon drawn outside, but tangential to, the circular buffer zone(s), defined by the latitudinal and longitudinal coordinates of its corners.

For example, a DMA for three whales would consist of a core area with a radius of 4.8 nm (9 km) plus the 15-nm (28-km) circular zone or buffer for a total radius of 19.8 nm (37 km), and a diameter of 39.6 nm (73 km).

A DMA would remain in effect for a minimum of 15 days from the date of the initial designation and automatically expire after that period. The period may be changed if subsequent surveys within the 15-day period demonstrate that (a) whales are no longer present in the zone, in which case the DMA would expire immediately upon making this determination; or (b) the aggregation has persisted, in which case NMFS would extend the period for an additional 15 days from the date of the most recent sightings in the zone.

NMFS is considering two options for DMAS: the Mandatory DMAs Option (in which case vessels would be required either to traverse the DMA at a restricted speed or to route around it) and Voluntary DMAs Option (in which case, vessels would be encouraged, but not required, to traverse the DMA at restricted speed or route around it). Mandatory DMAS are included in Alternatives 2 and 5; voluntary DMAS are included in Alternative 6. As previously noted, NMFS is proposing a 10-knot speed restriction; however, the FEIS also considers restrictions of 12 and 14 knots. Like all the measures considered, DMAS would only apply to non-sovereign vessels 65 ft (19.8 m) or longer.

2.1.5 Summary of Operational Measures Considered

A summary of the vessel operational measures considered is provided in Table 2-4.

**Table 2-4
Summary of All Operational Measures Considered**

Region		Measures	Period of Application	Included in Alternative	
Southeast (SEUS)		Southeast SMA or MSRS WHALESSOUTH/Critical Habitat SMA. and/or Recommended routes	November 15 to April 15 November 15 to April 15 Year-round	6 3 and 5 4, 5, and 6	
	Mid-Atlantic (MAUS)	Separate SMAs (20-nm SMAs or 30-nm SMAs option) or One continuous 25-nm SMA	November 1 to April 30 October 1 to April 30	6 (20-nm SMAs option) 3 and 5	
		Northeast (NEUS)	Cape Cod Bay	CCB SMA or Critical Habitat SMA and/or Recommended Routes	January 1 to May 15 Year-round Year-round
Off Race Point	Off Race Point SMA or SAM West SMA			March 1 to April 30 Year-round	6 3 and 5
	Great South Channel			GSC SMA or SAM East SMA	April 1 to July 31 Year-round
All Three Regions			Mandatory DMAs or Voluntary DMAs	Year-round Year-round	2 and 5 6

2.2 FEIS Alternatives

The alternatives evaluated in the FEIS and described in this section differ slightly from those assessed in the DEIS. The changes, detailed in Section 2.3, were made in response to comments received on the DEIS and proposed rule.

With the exception of Alternative 1, each of the alternatives would enact one or more of the vessel operational measures described in Section 2.1. For all alternatives that include speed restrictions, NMFS' proposed restriction is 10 knots. However, the FEIS also evaluates impacts based on speed restrictions of 12 and 14 knots.

In addition to the alternatives described below, the FEIS incorporates by reference DEIS alternative 6 (the DEIS preferred alternative) and associated analyses.

2.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, no new vessel operational measures would be implemented. NMFS would continue to implement existing measures and programs to reduce the likelihood of right whale mortalities from ship strikes. Research would continue and existing technologies would be used to determine whale locations and pass this information on to mariners. Ongoing activities include the use of aerial surveys to determine right whale locations and notify mariners accordingly via a comprehensive, multi-agency information dissemination program, which includes vessel speed advisories; the operation of MSRS; support of Recovery Plan Implementation Teams; education and outreach programs for mariners; and ongoing research on technological solutions. Additionally, non-regulatory actions may be taken and existing conservation measures (see Section 1.2) would remain active.

Alternative 1 is not a reasonable alternative because existing conservation measures have not sufficiently reduced the threat of ship strike to right whales or improved chances for species recovery. Therefore, this alternative does not meet the requirements of the ESA and the MMPA to protect the endangered North Atlantic right whale as specified in these two statutes. However, the No Action Alternative is analyzed in this FEIS per the CEQ's regulations, because it provides a baseline against which to assess the impacts of the action alternatives.

2.2.2 Alternative 2 – Mandatory Dynamic Management Areas

Alternative 2 would incorporate the elements of Alternative 1 (i.e., continuing existing conservation measures) plus the mandatory DMA component of the operational measures, as described in Section 2.1.4. Compliance with DMAs would be mandatory because DMAs are a stand-alone measure under this alternative. DMAs would be defined, as warranted by right whale sightings in all US territorial waters and within the EEZ along the East Coast.

Successful implementation of this alternative would depend on maintaining survey efforts and ensuring that specific sighting locations are recorded and made available. A commitment to continuing aircraft-surveillance coverage and expanding coverage in the mid-Atlantic, as necessary, would be required. This alternative would require a larger commitment of resources than the other alternatives, as aerial surveys are time-intensive and expensive. Human safety risks are inherent to aerial surveys, especially when they are conducted in inclement weather, and

increasing the number of aerial surveys would increase these risks. This alternative relies on a single new measure, which would not have as great a conservation value as it would if used in concert with other measures.

2.2.3 Alternative 3 – Speed Restrictions in Designated Areas

Alternative 3 includes the elements of Alternative 1 plus the following measures:

- In the SEUS region, the MSRS WHALESSOUTH/Critical Habitat SMA Option.
- In the MAUS Region, the Continuous 25-nm SMA Option.
- In the NEUS Region, the SAM West, SAM East, and Critical Habitat SMA Options.

SMAs under Alternative 3 would be larger or last longer than under the other alternatives that include SMAs.

2.2.4 Alternative 4 – Recommended Shipping Routes

This alternative includes all the elements of Alternative 1 plus the recommended routes, as described in Sections 2.1.1 (for the SEUS region) and 2.1.3 (for the NEUS region). This alternative does not include speed restrictions. No measures would apply to the MAUS region.

2.2.5 Alternative 5 – Combination of Alternatives

This alternative includes all elements of Alternatives 1 through 4 as previously described. As Alternative 5 includes the mandatory DMAs of Alternative 2, the larger and/or longer SMAs of Alternative 3, and the recommended routes of Alternative 4, it would provide the highest level of protection for the right whale population.

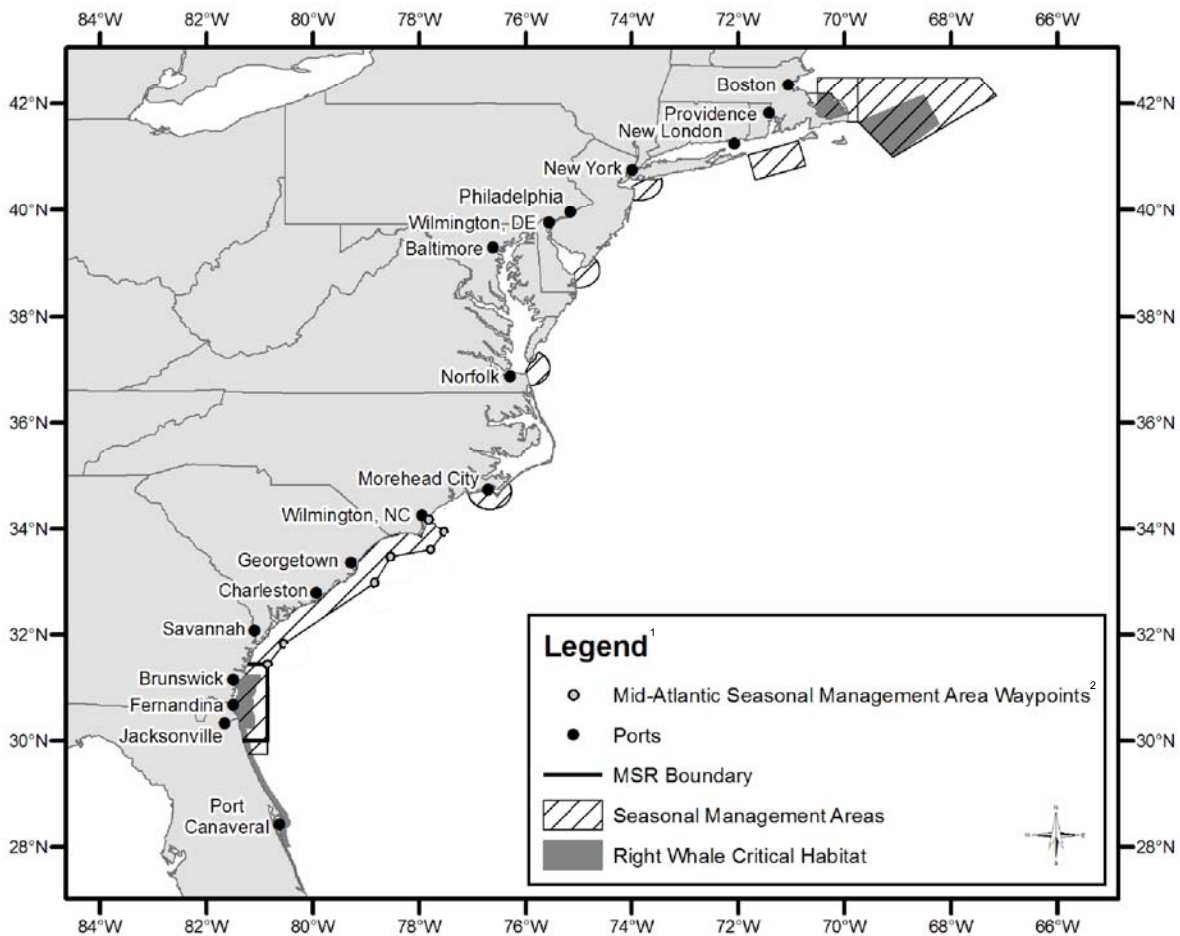
2.2.6 Alternative 6 – Proposed Action (Preferred Alternative)

Under Alternative 6, the preferred alternative, NMFS would implement the following operational measures:

- In the SEUS region, Southeast SMA Option and recommended routes.
- In the MAUS region, Separate SMAs (20-nm SMA option).
- In the NEUS region, CCB SMA, Off Race Point SMA, and GSC SMA options as well as recommended routes.
- In all three regions, Voluntary DMAs Option. (NMFS would evaluate the compliance rate and effectiveness of the DMA measures and use this information to inform future agency action, including consideration of mandatory DMAs.)

Additionally, under Alternative 6, the operational measures would expire five years after their date of effectiveness. Alternative 6 is illustrated in Figure 2-18.

Alternative 6 - Proposed Action



¹ Alternative 6 also includes voluntary DMAs (not shown)

² See Figure 2-4 for waypoint coordinates

Figure 2-18

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2.2.7 Summary of Alternatives

Table 2-5 summarizes the alternatives considered in this FEIS, and indicates, for each operational measure, whether it is included or not in the given alternative.

Table 2-5
Summary of Alternatives Considered in this FEIS

Operational Measure	Alternative					
	1	2	3	4	5	6 ⁶ (Proposed Action)
Recommended Routes	No	No	No	Yes	Yes	Yes
DMAs	No	Yes, mandatory	No	No	Yes, mandatory	Yes, voluntary
SMA s	No	No	Yes, SAM East, SAM West, and Critical Habitat SMA; Continuous 25-nm SMA; MSRS WHALES-SOUTH/Critical Habitat SMA	No	Yes, SAM East, SAM West, and Critical Habitat SMA; Continuous 25-nm SMA; MSRS WHALES-SOUTH/Critical Habitat SMA	Yes, CCB SMA, Off Race Point SMA, GSC SMA, Separate SMA (20-nm Option), Southeast SMA

2.3 Changes Made Between the DEIS and FEIS

A number of changes, corrections, and clarifications to the DEIS have been made based on public comments, the availability of new scientific studies, and the incorporation of other current information, such as fuel costs. The comments and responses in Appendix B provide detailed information on how comments were considered in development of this FEIS. This section focuses on the manner in which those comments, changes, and information informed the alternatives, and summarizes the changes in the alternatives between the DEIS and FEIS. The DEIS Alternative 6 and associated analyses and impacts remains an alternative fully considered, and the DEIS Alternative 6 and analyses from the DEIS are incorporated herein by reference. Note that all discussion of Alternative 6 throughout this FEIS is specific to FEIS Alternative 6. In addition to the alternatives described below, the FEIS incorporates by reference DEIS alternative 6 (the DEIS preferred alternative) and associated analyses.

⁶ The operational measures proposed under Alternative 6 would expire 5 years after their date of effectiveness.

2.3.1 Alternative 1 – No Action Alternative

There are no changes between the measures included under Alternative 1 in the DEIS and FEIS.

2.3.2 Alternative 2 – Mandatory Dynamic Management Areas

The only change under this alternative relative to the DEIS is the trigger mechanism. In the DEIS, there were two triggers:

1. A concentration of three or more whales (Clapham and Pace, 2001).
2. One or more whale(s) sighted within a TSS, recommended shipping route, or within a mid-Atlantic 30-nm (56-km) port entrance zone and the whales show no evidence of continued coast-wise transiting (i.e., they appear to be non-migratory or feeding).

The criteria for eliciting a DMA action have been modified in the FEIS; the same modifications apply to Alternative 2 and all other alternatives that include a DMA component. Only the first trigger developed by Clapham and Pace (2001) is now used. The second trigger proposed in the DEIS is no longer considered. NMFS made this change because it found that implementing a DMA based on the sighting of one whale in a shipping lane would place an undue burden on the shipping industry because the majority of sightings are individual whales.

2.3.3 Alternative 3 – Speed Restrictions in Designated Areas

Only one change has been made to Alternative 3 in the FEIS relative to the DEIS: in the SEUS, the effective dates have been changed to November 15 to April 15 from December 1 to March 31. Everything else has remained the same.

This revision is in response to commenters that questioned the discrepancy in dates between Alternatives 3 and 6, both of which contain this operational measure. In the DEIS, Alternative 3 had larger restricted areas and/or longer implementation periods than Alternative 6 except for the SEUS; the SEUS implementation period was shorter under Alternative 3. The implementation period for the SEUS SMA under Alternative 3 is now consistent with that under Alternative 6. The change was made because whales are in fact present in the SEUS during that period and would have been unprotected for up to one month under the Alternative 3 as proposed in the DEIS.

2.3.4 Alternative 4 – Recommended Shipping Routes

There are several changes to Alternative 4 in the FEIS relative to the DEIS: 1) specific coordinates for the recommended routes have been determined and the routes are now in effect; 2) periods in which the routes are effective have been revised; and 3) modification of the Boston TSS and creation of an ATBA are no longer included in the alternative. In the DEIS, the positioning of the recommended routes was based on the risk-reduction analysis by Garrison (2006). Since publication of the DEIS, the specific coordinates of the recommended routes have been determined and are used in this FEIS. In the DEIS, the dates considered for the recommended routes were January 1 to April 30 in Cape Cod Bay and December 1 to March 31 in the SEUS. In the FEIS, recommended routes are in effect year-round instead of seasonally.

Several commenters questioned the rationale for the shorter implementation periods under Alternative 4, and year-round routing measures will afford protection to whales occurring at times outside of the typical feeding season. Establishing an ATBA and modifying the TSS are no longer included in this alternative because they will be established by the IMO independently of, and on a different schedule from that of, NMFS' vessel operational measures (see Section 2.1).

2.3.5 Alternative 5 – Combination of Alternatives

Alternative 5 of the FEIS incorporates the changes made to Alternatives 1 through 4 as described in Sections 2.3.1 through 2.3.4.

2.3.6 Alternative 6 – Proposed Action (Preferred Alternative)

The following changes have been made to Alternative 6 in the FEIS relative to the DEIS: criteria for triggering the establishment of a DMA have been modified, as described in Section 2.3.2; compliance with DMAs has been made voluntary; the 30-nm (56 km) radius around the entrances to the ports of New York/New Jersey, the Delaware and Chesapeake Bay, and Morehead City and Beaufort, North Carolina has been changed to 20-nm (37 km); the ports of Wilmington, Georgetown, Charleston, and Savannah (in the MAUS region) are now included in one continuous SMA extending from the shore outward to 20 nm (37 km); the recommended routes, which have been established in two locations along the East Coast, are in effect year-round; and the measures would expire five years from their date of effectiveness.

The decision to make the DMAs voluntary was due, in part, to limitations in agency resources that would make it difficult to verify and subsequently establish DMAs quickly. This lag time between the initial right whale sighting and the effective date of the DMA would reduce the overall effectiveness of the program. Voluntary DMAs would be effective soon after the initial sighting, and mariners would be notified about the location of the DMA through customary maritime communication media. Additionally, voluntary DMAs will alleviate the economic burden on whale watch and ferry vessels if a DMA was established in their route during peak season.

After weighing the MAUS SMAs relative to the economic impacts on the shipping industry, NMFS decided to change all MAUS SMAs (except for the SMA offshore of Block Island Sound) from 30- to 20-nm (56- to 37-km). These SMAs still provide protection for the majority of right whale sightings while further minimizing impacts on shipping vessels⁷. An analysis of sightings data from 1972 through 2000 from the South Carolina/Georgia border to Connecticut (n=290) indicated that approximately 83 percent of all right whale sightings occurred within 20 nm (37 km) of the coast, and approximately 90 percent of all right whale sightings occurred within 30 nm (56 km) of the coast (NMFS, 2008, *unpublished*).

The creation of a continuous MAUS SMA from Wilmington, NC to south of Savannah, Georgia was based on comments and a review of sighting data by NMFS scientists who determined there are recurring right whale sightings between the ports of Wilmington, Georgetown, Charleston,

⁷ By reducing the proposed SMAs from 30 to 20 nm, the weighted average coast-wide time burden per vessel arrival was reduced from 73 minutes to 53 minutes; transit time through the SMAs dropped from 28 minutes to 16 minutes (weighted average, depending on the port).

and Savannah. This change will primarily benefit right whale aggregations off the coast of South Carolina.

The recommended routes were placed on nautical charts in late 2006, and after this point, the USCG typically does not remove routing measures from charts on a seasonal basis.

Finally, in the FEIS, the operational measures included in Alternative 6 would expire five years from their date of effectiveness, except for the recommended routes. Some commenters, in light of existing ship strike data, have raised issues regarding whether the measures would significantly reduce serious injury and deaths of large whales caused by ship strikes. In recognition of these concerns, and of the burdens imposed on vessel operators, the measures included in Alternative 6 would expire five years from the date they become effective. During the five-year effectiveness of the measures, to the extent possible with existing resources, NOAA will synthesize existing data, gather additional data, or conduct additional research on ship-whale interactions to address those uncertainties. NOAA will also review the economic consequences of the measures. After this analysis is complete, NOAA will determine what further steps to take regarding the measures.

2.3.7 All Alternatives

General changes that apply to all alternatives involve two exemptions. In response to comments concerning safety of navigation and vessel maneuverability at 10 knots, NMFS is now providing an exemption from speed restrictions for vessels to maintain safe maneuvering speed under certain conditions (see Section 1.4). Another exemption from speed restrictions applicable to all FEIS alternatives is for law-enforcement vessels of a state, or political subdivision thereof, when engaged in law-enforcement or human-safety missions.

2.4 Alternatives Considered and Dismissed from Further Analysis

Based on consultations, meetings, and public comments involving participants from NMFS, other Federal agencies, state agencies, concerned citizens and citizens' groups, environmental organizations, and the shipping industry, many potential operational measures that might reduce right whale ship strikes were identified and considered. This section discusses potential measures and alternatives that were considered and dismissed from further analysis because they did not adequately meet NMFS' purpose and need for one or several of the following reasons:

- They were not sufficiently protective of right whales.
- They imposed too many restrictions on the shipping industry or would significantly hinder maritime commerce.
- They did not allow NMFS to fulfill its mandate and/or required too much in terms of agency resources.
- They were based on currently unavailable technology.

General alternatives that were considered and dismissed are addressed in Sections 2.4.1 to 2.4.8. Sections 2.4.9 to 2.4.13 address dismissed alternatives that were region-specific.

2.4.1 Speed Restrictions of 8 Knots or Less or over 14 Knots

NMFS dismissed alternatives involving speed restrictions of or less than 8 knots because these speeds might affect a vessel's maneuverability and would result in undue economic hardship to the shipping industry. Although a speed restriction of 8 knots or less would be expected to reduce the severity and number of ship strikes, it would also have an economic impact several orders of magnitude larger than that of the range of speed restrictions considered in the alternatives retained for analysis. Therefore, speed restrictions of 8 knots or less would not meet the purpose and need.

Speed restrictions greater than 14 knots, on the other hand, would have significantly less economic impacts. However, such restrictions would not meet NMFS' purpose and need: since the majority of recorded ship strikes occurred with vessels traveling at 14 knots or faster (Jensen and Silber, 2003; Laist *et al.*, 2001), speed restrictions above this threshold likely would not substantially reduce the risk of ship strikes.

2.4.2 Restrictions for Vessels Less than 65 Feet in Length

Although vessels less than 65 ft (19.8 m) in length have been involved in ship strikes of large whales, NMFS considers that such vessels pose a lesser risk to right whales than larger ones. Small, fast vessels with planing hulls have shallow drafts and are highly maneuverable, which increases the mariner's ability to avoid a whale if one is sighted. Small vessels with single positive-displacement hulls are limited by their hull speed,⁸ and therefore these vessels have a reduced likelihood of seriously injuring or killing a whale relative to vessels 65 ft (19.8 m) and longer. Consequently, NMFS dismissed alternatives that would include restrictions to vessels less than 65 ft (19.8 m) in length (see Section 1.4). However, because of a recent ship strike by a 43-foot (13-m) vessel and other such incidents, NMFS will continue to consider means, including future rulemaking, to address strikes by vessel classes below 65 ft (19.8 m). In collaboration with other organizations, NMFS has developed and will implement education and outreach programs about the vulnerability of right whales to ship strikes, geared toward recreational, fishing, and other coastal maritime activities that generally involve vessels less than 65 ft (19.8 m).

2.4.3 Satellite Tagging

NMFS dismissed from further consideration the option of attaching implantable satellite tags to all or nearly all individual right whales for tracking and avoidance purposes because satellite tags are difficult to attach to whales and often have a short useful life. Even if tags could be successfully and safely attached to most or all whales and real-time information on the location of the whales could be transmitted to ships, mariners would need to avoid collisions and this would still require slowing down or entirely avoiding certain areas. In light of the difficulty of implanting tags in a significant number of right whales and the technological and logistical constraints (e.g., ship time, weather, human safety) associated with tagging, NMFS considered this alternative unreasonable and dismissed it from further consideration.

⁸ The maximum speed of a ship with a displacement hull is dependent upon the waterline length of the vessel. This speed is called the hull speed. The longer the hull, the higher the hull speed.

2.4.4 Escort Boats Equipped with Acoustic Detection and/or Deterrence Devices

Under this option, escort boats would accompany vessels in the vicinity of regulated port areas and while transiting in critical habitat areas. The escort boats would be equipped with acoustic detection or deterrence devices. A detection device would inform the captain of the presence of whales in the area; a deterrence device would emit some kind of acoustic alert that would encourage the whale to stay away from the ship. However, the kind of technology assumed by this option does not yet exist and the cost of developing and implementing it (including outfitting the escort boats) would be prohibitive. In addition, studies have shown that the behavioral changes demonstrated by right whales when they are exposed to alarm devices may actually increase the risk of ship strikes (Nowacek *et al.*, 2004). Finally, there are concerns about the impact of adding new sources of noise to the ocean. Consequently, NMFS is not considering this alternative further.

2.4.5 Limit Port Approaches to Daylight Transits Only

The premise for this potential measure is that vessels cannot spot a right whale at night; therefore, vessels would limit their travel through whale-sensitive areas to daylight hours only. However, there is little expectation that vessel crews could reliably, consistently, and under all sea conditions spot a right whale even in daylight. Furthermore, sighting a whale does not ensure that the mariner will be able to avoid it. Many collisions probably occur when whales surface unexpectedly close to the vessel. This measure would significantly hinder maritime commerce for little potential return. Therefore, NMFS dismissed this option from further consideration.

2.4.6 Voluntary Measures Only

NMFS also dismissed from further consideration voluntary compliance, as opposed to mandatory compliance, with the proposed operational measures. As shipping companies that would choose to participate would suffer a competitive disadvantage compared to the companies that would choose not to participate, it is likely that few companies would choose to participate. As a result, proposing only voluntary measures would not fulfill NMFS' mandate under the ESA. The relatively low initial compliance rate for the MSRS (see Section 1.2.1.2), even though it is mandatory, further suggests that voluntary-only measures would have very limited success. Therefore, proposing only voluntary measures would not be a viable alternative to meet NMFS' purpose and need.

2.4.7 Requiring Trained Marine Mammal Observers on Commercial Shipping Vessels

NMFS considered requiring the posting of trained marine-mammal observers on vessels of 65 ft (19.8 m) and greater length to detect whales. However, there are several limitations associated with this measure that preclude it from being a viable ship-strike reduction measure. The bridge of most commercial shipping vessels is toward the aft (back) of the ship, which would prevent the observer from sighting a whale directly in front of the vessel – an especially severe limitation since in many cases, it may be necessary to spot the whale hundreds of feet from the bow to be

able to avoid a strike. Furthermore, the probability of an observer sighting a whale in rough seas or in times of low visibility is limited; at night, the probability is extremely low. In the event that a whale is sighted by the observer, depending on the location of the whale relative to the vessel, there may not be sufficient time for the captain to slow the vessel or change direction to avoid the whale. For these reasons, NMFS is not considering this measure further in this EIS.

2.4.8 Including Federal Vessels

NMFS has considered including vessels owned or operated by, or under contract to, Federal agencies into one or more of the alternatives. A description of the number and operations of these vessels is provided in Section 3.4.7. The number of Federal vessels that operate on the US East Coast is relatively small compared to the number of commercial vessels. Furthermore, the majority of relevant Federal agencies already employ ship-strike reduction measures, which are summarized in Appendix A. Most of these measures are similar to, if not more stringent than, the measures considered in this FEIS. As discussed in Section 1.8.3, NMFS expects to review Federal actions involving vessel operations to determine where ESA Section 7 consultations would be appropriate. NMFS may request agencies to reinitiate consultation, although the decision to reinitiate lies with the action agency. NMFS also requests all Federal agencies to voluntarily observe the conditions set forth in the regulations when and where this would not compromise their missions. For these reasons, and because NMFS believes that the national security, navigational, and human-safety missions of some agencies may be compromised by mandatory vessel-speed restrictions for Federal vessels, any alternative that would include such restrictions for Federal vessels was dismissed from further consideration.

2.4.9 Management Measures South of the SEUS Critical Habitat

NMFS determined that extending the Southeast management area south of the SEUS critical habitat boundary was unnecessary. Waters there are shallow and, as a result, deep-draft and other vessels remain further away from shore. The pilot buoy for Port Canaveral is 3 nm (5.6 km) from the coast. Most vessels calling at Port Canaveral take on a pilot and would have to slow down well before the pilot buoy. The critical habitat, where most whale sightings occur, extends only 5 nm (9.3) km offshore in this area, so that vessels are already slowing down through the area where right whales reside, making additional restrictions unnecessary. Therefore, this measure was dismissed from further analysis.

2.4.10 New Shipping Routes in the MAUS Region

Establishing new shipping routes in the MAUS region is not a reasonable alternative because, due to the large size of the area, right whale migratory patterns there are somewhat unpredictable (whales are generally traveling through the area and rarely reside). There are not many existing shipping routes in the MAUS. Defining new routes would unnecessarily constrain the shipping industry without yielding any substantial benefits to the right whale population. Therefore, NMFS dismissed this alternative from further consideration.

2.4.11 Implement an MSRS in the MAUS Region

Establishing a MSRS in the MAUS region was dismissed from further analysis because the MAUS region mostly is a migratory corridor for right whales and few, if any, sustained aggregations occur there. Migrating whales are difficult to spot via surveys and only a small amount of real-time information would be transmitted back to a ship. Also, sighting locations are likely to be short-lived since, generally, whales only transit through the area. Finally, whales' presence varies seasonally in the MAUS, which would complicate compliance with the MSRS. Overall, the conservation benefits of this measure likely would not justify expending the resources needed to operate and maintain the system. Therefore, implementation of an MSRS in the MAUS area is not a reasonable alternative and NMFS has dismissed it from further consideration.

2.4.12 Expand Existing MSRS into the Gulf of Maine

Many of the vessels weighing more than 300 gross registered tons (GRT) that enter the Gulf of Maine transit through the existing MSRS reporting area in the Northeast. Whale sightings throughout the Gulf of Maine (within the area of responsibility of the First Coast Guard District) are reported to ships via the MSRS, NAVTEX⁹, and Broadcast Notice to Mariners. Therefore, extension of the MSRS to the Gulf of Maine is unwarranted, and NMFS dismissed this option from further consideration. To address those operators and areas (tugs and tows, small ports, and pilots) not covered by the existing MSRS, NMFS is planning a comprehensive outreach and education program that would accomplish the same goals as an MSRS without the additional regulatory burden.

2.4.13 Seasonal Management Measures in the Gulf of Maine

While right whales do occur in the Gulf of Maine, their presence is neither constant nor periodic. Where and when a right whale or aggregation of right whales will appear cannot be predicted in advance. In addition, vessel traffic in this area is relatively light and exhibits little common or predictable patterns. Therefore, there is no justification to define SMAs in the Gulf of Maine area. SMAs would unnecessarily burden the shipping industry with little advantage to right whales. Consequently, NMFS dismissed this option from further consideration.

2.5 Environmentally Preferable Alternative

The CEQ's implementing regulations for NEPA require that the environmentally preferable alternative(s) be identified in the Record of Decision. The proposing agency is encouraged to identify the environmentally preferable alternative in the EIS. However, it is not required to select the environmentally preferable alternative as its preferred alternative.

Although the environmentally preferable alternative varies with the resource considered, Alternatives 3 and 5 include a combination of measures that would provide the best protection of

⁹ NAVTEX is an IMO-designated communication system used to transmit urgent marine-safety information to ships worldwide. In the US, NAVTEX is broadcast by USCG facilities.

biological resources while causing minimal damage to the environment. Both alternatives would result in a major positive impact to right whales. However, Alternative 3 would offer only minor benefits to other marine mammals, whereas Alternative 5 would offer them more protection through the addition of DMAs and recommended routes. Alternative 5 may result in minor adverse effects on water quality in the SEUS, whereas Alternative 3 would not affect water quality. Impacts on other resources are comparable between Alternatives 3 and 5, as summarized in Table 2-6.

**Table 2-6
Environmentally Preferable Alternatives Analysis by Resource Area**

Resource Area	Alternative					
	1	2	3	4	5	6
Right Whale	-	+	++	+	++	+
Other Marine Mammals	-		+		++	+
Sea Turtles	-		+		+	+
Bathymetry						
Water Quality				-	-	-
Air Quality		+	+		+	+
Ocean Noise		+	+	-	+	+
Socioeconomics		+	-	+	-	-

Note: (+) indicates that there is a minor positive impact, (++) indicates a major positive impact, (-) indicates a negative impact, and a blank cell indicates that there is either no net impact or that the impact is negligible.

2.6 Preferred Alternative

CEQ's implementing regulations for NEPA require the agency to identify a preferred alternative that best fulfills its purpose and need. The stand-alone measures included Alternatives 2, 3, and 4 would only partially meet the purpose and need. Although Alternative 4 would result in the least economic impacts of all the alternatives, recommended routes would only provide a minimum level of protection to right whales. Alternative 2 also would have a relatively low economic impact, although DMAs as a stand-alone measure are unlikely to provide sufficient protection against ship strikes. Alternative 3 would provide a higher level of protection against ship strikes than Alternatives 2 and 4, although it would have the second highest economic impact. Even though Alternative 5 would provide the highest level of protection to right whales, it also has the greatest economic impact, which does not meet the second goal of the purpose and need – to "...reduce the occurrence and severity of vessel collisions with North Atlantic right whales, thereby contributing to the recovery and sustainability of the species *while minimizing the effects on the shipping industry and maritime commerce.*" Alternative 6, which would meet both goals – reducing the number and severity of ship strikes, and minimizing the economic impact – is, therefore, NMFS' preferred alternative.